THE NATURAL HISTORY OF THE EARTH,

Illuſtrated, and *Inlarged*:

AS ALSO

DEFENDED,

And the

OBJECTIONS againſt it,

Particularly thoſe lately publiſh'd by

Dr. *Camerarius*, anſwered.

Written originaly in *Latin* by *JOHN WOODWARD*, M. D. Profeſſor of Phyſick in *Greſham College*, Fellow of the *College of Phyſicians*, and of the *Royal Society*: And now firſt made *Engliſh* by *BENJ. HOLLOWAY*, L. L. B. and Fellow of the *Royal Society*.

LONDON:
Printed and Sold by THO. EDLIN, at the *Prince*'s
Arms, over-againſt *Exeter-Exchange*, in the
Strand. MDCCXXVI.

The Author's

PREFACE.

S*Everal Years are now paſs'd, ſince I ſet forth my* Natural Hiſtory of the Earth, *in our own Language, for the Uſe of* Engliſh *Readers. This the learned Dr.* Scheuchzer, *Profeſſor of Mathematicks at* Zurich, *publiſh'd afterwards to the learned World in* Latin, *under the Title of* Geographia Phyſica. *As there were, in that Work, ſeveral Things altogether new, it cannot well be thought ſtrange that ſome People ſhould entertain Doubts concerning them, and ſet themſelves in Oppoſition to them; which they* *did, with great Pains and Vehemence; but not with that Force or Weight of Argument to deſerve to be ſeveraly anſwer'd by me. Beſides, I am of a Temper not diſpoſed to Reſentment, nor indeed to Controverſies of any Kind. But when the learned Dr.* Camerarius's Diſſertations *came abroad, I preſently diſcerned ſo great Acuteneſs, Diligence, and Happineſs of Invention in Him, that ſcarce any Thing had been objected by others that was not there propoſed by him, with ſome Additions of his own entirely new. So that, in returning an Anſwer to him, I ſhall likewiſe refute all the reſt.*

They who ſhall expect to find, in this Treatiſe, any Oſtentation of Skill in Diſpute, or Triumph over my Adverſary, will be diſappointed. The Cauſe I defend is ſupported by Nature itſelf, and carefull Obſervations of Things; nor will I any where depart from theſe in this my Defenſe.

Beſides the Arguments which are now brought in Confirmation of my Doctrines formerly publiſhed, here are

are offered others not produced before: and ſuch as, I hope, will appear to be of no ſmall Moment, nor in any wiſe unworthy Conſideration. The Subject of which I write certainly demands the ſtricteſt Examination: and I ſhould not a little rejoice could I be perſwaded I have treated it with an Exactneſs ſuitable to its Dignity. But, whatever this my Performance may be, it will find Pardon from Readers of Candour and Humanity, and all ſuch who rightly conſider with how great Care and Concern, the Thoughts of thoſe are taken up, who apply themſelves to the Practice of Phyſick with that Fidelity and Diligence it requires, which I ever ſhall do.

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THE
NATURAL HISTORY
OF THE
EARTH

Illuſtrated, and *Inlarged*: as alſo, *Defended*, particularly againſt the late OBJECTIONS of Dr. *Camerarius*.

PART I.

To the Earl of PEMBROKE.

My LORD,

The Reaſon of my publiſhing this Anſwer.

THE learned Dr. *Camerarius*, Profeſſor of Phyſick at *Tubingen* * having attack'd me with ſo much Eagerneſs and Vehemence, tho', every where, with great Care and Art concealed under a Shew of

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* In *Diſſertationibus Taurinenſib. Tubingæ editis*. 8vo. 1712.

Complaiſance and good Manners, Your Lordſhip, and all others of like impartial and ingenuous Diſpoſition, would think me wanting to myſelf ſhould I neglect to give ſome Account of my Studies, and the Succeſs of my *Eſſay towards a Natural Hiſtory of the Earth*, publiſh'd ſome Years agoe; which otherwiſe there would have been no Occaſion for me to have done.

The Method and Deſign of my Studies,

As to my Diligence in theſe Studies, I may be allow'd to affirm that for many years I have apply'd myſelf to them with great Conſtancy. I have carefully ſearch'd the principal Mines of our Iſland, and the Bowels of the Earth by what ever Means laid open to View; obſerving the Strata of every Sort of terreſtrial Matter, the Manner in which the Minerals there lay, with the Order wherein the ſeveral Kinds of Foſſils were found: and the Main of what I diſcover'd from theſe Obſervations I ſet forth in that Book with the utmoſt Truth and Exactneſs.

to trace and ſet forth the true Laws of Nature.

Nor did I take thoſe Pains, or write that Book, with any View of ſupporting ſome former Hypotheſis of my own, as that Gentleman ſuſpects, and more than once charges me to have done; but to deſcribe, to others, with what Accuracy I could, the true State of thoſe Things which I had myſelf obſerved. And afterwards to advance ſome Propoſitions, not ſuch as I might have framed in my Mind before, or that ſhould carry only ſome Shew of Truth, but that ſhould be certain, as following naturally and plainly from the very Obſervations themſelves; without which, I conceived, the whole Deſcription of thoſe Obſervations would not be of any real Uſe.

The Approbation of the Learned.

As ſoon as I had publiſh'd that Treatiſe, impartial Judges, eſpecially they who had apply'd themſelves to theſe Studies, publickly confeſſed this Matter to be highly worthy of a more attentive Conſideration both of themſelves and of others: and that many of my Propoſitions were of the greateſt Importance. They, from that Time, repreſented the Study of Minerals, as moſt beneficial to Mankind, and regretted its having lain ſo long neglected. In a Word, that Book found Fortune ſo favourable, or the Learned ſo well inclined to it, that in a little Time it was carried over the greateſt Part of *Europe*, and every where receiv'd with Candour, and not without Approbation.

Hindrances to my Deſign in the Natural Hiſtory of the Earth.

This was ſo great an Encouragement to me, that, if my own private Affairs, and that conſtant Attendance which the Practice of Phyſick requires, had not otherwiſe engaged me, and the publick Commotions, occaſion'd by the long and cruel War, drawn off the Minds of Men from the more liberal Arts of Peace, I had certainly made a greater Progreſs in it. What added ſtill more to my Satisfaction was, that from the firſt publiſhing that Work, no Man of Candour and Judgment ever made any doubt of my Obſervations, or ever went about to refute the Propoſitions drawn from them.

After the publiſhing my Book, ſeveral learned Men, rejecting their former Opinions, embrac'd mine.

Indeed, before the publiſhing that Work, Naturaliſts were generally of Opinion, that the Shells, found in Stone, and digged out of the Earth, were not the Produce of the Sea, but meer Stones * form'd in the Earth, and of terreſtrial Origin. But, I am perſuaded, there are now very few, if any, who diſpute their being the real Spoils of the Sea, and left behind, by the Deluge, at Land. This is certain, that of thoſe who have made the moſt accurate Search into theſe Things, with a View to diſcover their true Nature, not a few, rejecting their former Opinion, have imbraced mine: and even publickly defended and maintain'd it. Of the many I could name, I ſhall mention only one, whoſe Authority is equal to that of many, I mean Dr. *Scheuchzer*, a Perſon of diſtinguiſh'd Parts and Judgment, conſummate Learning, and who is deſervedly ranked among the firſt Naturaliſts of Europe. He publiſh'd, in the Year 1695, a Diſſertation *De Generatione Conchitarum*, wherein he endeavours to prove that theſe Bodyes ought to be reputed native and genuine Foſſils. But, afterwards, upon a carefull Peruſal of my Book, he publickly acknowledged * his Miſtake; confeſſing he had too haſtily embraced that Opinion.

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* See Mr. *Ray*'s 3 *Phyſico-Theol. Diſc.* p. 127.

Particularly Dr. Scheuchzer:

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* In *Epiſt. Dedicat. Geogr. Phyſ.*

nion. Thereupon, as became a ſincere Labourer in the Cauſe of Truth, he gave up his own, and came over to my Sentiments: and the many learned Works, wherein he has from that Time aſſerted and demonſtrated the Truth of this Opinion, beſides his other Writings, abundantly ſhew the great Progreſs he has made in theſe Studies.

and many others,

In ſhort, the Teſtimonies of the greateſt Men that have wrote on the ſame Subjects, and their Approbations of my *Natural Hiſtory of the Earth*, are ſo many, and conſiderable, that I ſhould ſeem too much pleas'd with the Fruits of my own Studies in this Way, if I ſhould particularly recount them all. Neither is there any Need that I ſhould do that, ſeeing their Works are in every Bodies Hands. Nor had I ſaid any Thing of this Kind, now, nor hereafter, either privately among my Friends, or much leſs thus in publick, had not the juſt Defence of myſelf, and of the Cauſe, which ſo many great Men with me have approv'd, required it.

eſpecially the Writers of Germany,

But, after all, if what I wrote did not ſeem of Weight to the learned Dr. *Camerarius*, unleſs he thought himſelf more knowing than all thoſe Gentlemen, every where ſo deſervedly famous for their Knowledge in natural Things, and could not acquieſce in their Judgment, he ſhould not ſurely have gone about with ſo much Importunity to oppoſe his own ſingly to all theirs. For he acknowledges of his own Accord, that *I have eaſily won over, to my Side, the greateſt of thoſe in* Germany *who are taken with this Sort of Learning.* * After which Declaration, he had never ſet himſelf with ſo much Vehemence againſt an Opinion, received by them, jointly with me, had he not thought himſelf much more intelligent in theſe Things, than all of us.

who are moſt knowing in Foſſils.

This Teſtimony of his, *that the greateſt Men in* Germany *were eaſily brought over to my Opinion*, makes more for the Truth of it, and may juſtly be thought to add the greater Confirmation to it, becauſe there are in *Germany* more Sorts of Mine-

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* *Diſſert. Taurin.* p. 268, 269.

Minerals, more frequent and diligent Searches after them, more exact Experiments and Aſſays of Each: and conſequently a more eaſy and ſure Way of attaining the true Knowledge of the State and Nature of thoſe Things, than in any other Part of *Europe* beſides. For which Reaſon, as the *Germans* are moſt addicted to theſe Studies, they have been always allowed to have the greateſt Skill in them. What Pains they have taken, how ſhrew'd Judgment they have uſed in thoſe Studies, and how far the *Germans*, particularly the later Writers, have kept up the Prerogative ſo deſervedly conferr'd on their Nation, we have Proof beyond all Exception in the Works, of this Kind, which Dr. *Bayer* * Profeſſor at *Aldorf*, and Dr. *Spener* † of *Berlin*, as alſo other learned Men of that Country, have lately ſet forth. Now, ſince theſe appear in Favour of me, eſtabliſh my Doctrine by their Authority, and confirm it with their Arguments, I have certainly the leſs

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* *Deſcrip. Foſil. Territor. Norimberg.* 4to. 1708. † *Diſq; de Crocodilo in Lapide, aliiſq; Lithozois Miſcell. Berolin.* 1710. p. 99.

Cauſe of Apprehenſion from the Attacks of Dr. *Camerarius* alone, however eloquent, and, as I am forward to believe, knowing in other Matters.

From theſe Dr. Camerarius *diſſents, but without Reaſon.*

What moved him particularly to diſſent, not only from me a Stranger, and perhaps known to him merely by Name, but from the moſt noted Perſons of his own Country, and deſervedly celebrated, he beſt knows. But this I will be bold to ſay, whereever he has diſſented, in that Work, from mine and their Opinion concerning theſe Things, he has at the ſame Time departed from Obſervation and Fact; whereby he has given great Cauſe to doubt whether he has ſearch'd into Quarryes, Mines, and the other interior Parts of the Earth, with a Diligence needful to ſupport ſo large a Share of Poſitiveneſs.

Addreſs to Dr. Camerarius.

If a Perſon of his Eloquence and Politeneſs, ſhould here expect the ſame Accompliſhments in me, and think himſelf a little too roughly uſed, while I call in Queſtion not only his Candour toward myſelf, but his Skill in the Things he treats of, and his Induſtry in examining into the Nature of them, I hope he will Pardon me, when he finds I aſſert nothing in the following Diſcourſe but what I ſhall make clearly appear.

Part I. *of this Diſſertation; wherein is conſider'd his unfair Way of treating me, and his Miſrepreſentation of Things.*

I. Firſt, if he has read my Book with due Attention, I have great Cauſe of Complaint of his Want of Candour, almoſt every where, toward me. For he often aſcribes to me Things I never ſaid, and ſometimes ſuch as are apparently contrary to what I had expreſly ſet forth. There are Inſtances of this almoſt without Number; but I ſhall content myſelf with recounting only a few of them.

1. *Examples of this in his Enquiryes relateing to the* Belemnite.

1. Where he treats of the Nature of Foſſil Shells, contending earneſtly that they are not of Marine Production, he mentions the *Belemnite*, and aſks me * *under what Genus of marine Animals I would rank that?* as if I had aſſerted it to be of ſome *Genus of marine Animals.* Had I ſaid nothing of the Nature of the *Belemnites*, he might perhaps have fancy'd I took them for Crea-

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* P. 298. *Conſ.* alſo P. 349.

tures of the Sea. Tho' that would have been a little hard, from my Silence to judge of my Opinion. But when, *with the Conſent of all Naturaliſts*, I had expreſly affirm'd, that † *the* Belemnites *were realy Foſſils, and of mineral Origin*, I can impute his Suſpicion of my Opinion in this Affair, which I have clearly expreſs'd, to nothing but Prejudice, and too much Precipitancy; being unwilling to attribute it to any other Cauſe in the leaſt unworthy the Character of ſo great a Man. Hence alſo it is, that he confounds the ‡ *Ætites*, and *Geodes*, both mere Stones, with Shells, and other Things of marine Extract.

Of the Ætites *and* Geodes.

2. *Of the* Ammonite.

2. He likewiſe takes great Pains to demonſtrate the * *Cornu Ammonis not to be a Nautilus*: and indeed, for what I have ſaid, he might as well have uſed other Arguments to prove it no *Murex*, or no *Oyſter*; for I never aſcribed it more to the Claſſe of that, than of either of theſe.

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† *Nat. Hiſt. Earth. paſſim.* ‡ *Diſſert. Taurin.* p. 299. * p. 296. 297, and 340.

But yet ‡ the *Ammonite* is realy a Shell, of the wreathed or turbinated Kind, produced at Sea, and brought from thence to Land. It has the Marks, and what we call Eſſential Propertyes, of a true Shell, tho' of a Kind plainly different from all thoſe.

3. *The* Ammonite, *inhabiting the inner and deeper Parts of the Sea, is ſeldom flung upon the Shores by Storms.*

3. The *Ammonites* are indeed but rarely light of upon the Shores. I never met with above one Species of them found there; whereas out of the Earth there are dig'd very many. But all the Kinds of Shells, that are to be found on every Shore, have not yet been obſerv'd and collected with due Care. Beſides, there are many which are bred in the inmoſt and deepeſt Parts of the Sea, where they have their Abode, and never of themſelves come near the Shores, nor are flung out of their native Seats, even by the Violence of Tides or Storms. Of ſome Kind of theſe I take the *Ammonite* to be. Moſt of thoſe Shells which are caſt upon the Shores, by Tides, or Storms, are ſuch as were bred not far off, and among the Shal-

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‡ See *Nat. Hiſt. Earth, Prælim Diſſert. in fin.*

lows and Flats. The Diſturbances given by Tides, or Tempeſts, never reach the inner and deeper Receſſes of the Ocean. It is therefore leſs to be wonder'd at, if the Shells produced in thoſe Places, and there reſiding, are ſeldom found caſt upon the Shores.

Leſſer Storms do not reach the deeper Parts of the Main, and therefore remove not the Shell-Fiſh which reſide there.

The learned Dr. *Camerarius* indeed profeſſes himſelf † *doubtful of the conſtant Calmneſs of the Bottom of the Sea.* This, in ſo great a Man eſpecially, I cannot but much wonder at, ſince the Thing is ſo certain, and ſo generally known: and the Truth of which he might have had throughly confirm'd to him, from Books, as well as from the very Perſons, who, when the Surface of the Sea has been moſt tempeſtuous, have dived to the Bottom. But ſince there is perhaps none of theſe Perſons known to us both, to whom I might refer Dr. *Camerarius*, I will recommend him at leaſt to one great Author, out of many, who has wrote of this Matter; one, of whoſe Fidelity the moſt ſuſpicious cannot doubt. I mean Mr. *Robert Boyle*, the great, and laſting Honour of his noble Family,

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† Page 288.

mily, who is deſervedly ranked among the higheſt Philoſophers of our Age, and who has wrote a * Treatiſe on this Subject, entitled, *Relations about the Bottom of the Sea.* In the third Section of that Treatiſe he may find, that the *Water at the Bottom of the deeper Seas, is ever calm, nor in the leaſt diſturb'd, even whilſt its Surface is moſt troubled, and tempeſtuous.* He may alſo there learn that *Divers take the Water, when the Sea is ſo very rough that ſcarcely any Veſſels will hazard themſelves out of Port*; ſo that he was under a very great miſtake, when he haſtily ſaid, † *that Divers never go under Water during great Storms.* But to the Queſtion he puts ſoon after, ‡ *why Divers do not bring on board, from the Bottom of the Sea, ſome of theſe Shells* call'd by Naturaliſts *Pelagiæ*, becauſe they reſide only in the Deep of the Main? I return for Anſwer, in the firſt Place, what, tho' it be eaſy and obvious, may deſervedly be thought ſatisfactory, and a fit Solution of ſuch a Difficulty; that thoſe Perſons, not being Philoſophers themſelves, nor employed, by ſuch as are, with Deſign to promote natural Knowledge, but meerly in Hopes of Gain, when they have dived to ſo great a Depth, with Hazard of their Lives, look for Pearls, and Things of Value; but they neither collect, nor obſerve others which would be plainly of no Uſe to them, nor, if they ſhould bring them up, reward their Labour. But, if this Anſwer ſhould not ſatisfy the curious *Camerarius*, he ought alſo to obſerve, that thoſe Divers look for Pearls not far from the Shores; neither do they go under Water but in ſuch Places as are meer Shallows, if compared with the more remote and deep Parts of the Main, which I ſpeak of. No Diſturbance, as may be reaſonably believ'd, has ever been given to thoſe inner Receſſes of the Ocean, ſince the univerſal Deluge; at which Time thoſe Places were totally broken up, and the Shells, inhabiting there, being forced from their antient Dwellings, born to the moſt diſtant Places, and not a few left in thoſe their new Seats at the Retreat of the Waters. Thoſe, in my Opinion, are what we now frequently find in the Earth, but very ſeldom on the Shores, and of the Origin and Nature of which the learned *Camerarius* has raiſed this Diſpute.

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* *Mr.* Boyle's *Tracts*, 8vo. Oxon. 1671.
† *Diſſertat. Taurin.* p. 288. ‡ Pag. 288.

But greater Storms reach thoſe Parts, and bring up Shells that are rare, and never otherwiſe ſeen.

After all, tho' thoſe Shells are never now moved from their native Places, yet there are others often flung upon the Shores by greater Storms, which leſſer never reach. The moſt violent of theſe Storms, by us called *Hurricanes*, are thoſe which happen about *Barbadoes*, and other Iſlands of the ſame Sea, and in the adjacent Parts of *America*. Where thoſe Storms ariſe, they uſually rage more vehemently, than any *European* can eaſily credit, or conceive to himſelf, and diſturb the Seas to a much greater Depth than uſual. After thoſe Storms, Shells lie expos'd on the Shores, in much greater Numbers, than are thrown forth by leſſer Storms, and of Kinds quite different from them. Neither is it to be doubted, but as thoſe more violent Tempeſts caſt up Shell-Fiſh very rarely otherwiſe ſeen, being ſuch as inhabit the inner Parts of the Sea, where leſſer Storms do not reach, ſo, if other yet more violent Tempeſts ſhould happen, ſufficient to diſturb the Bottom of the deepeſt Seas, they would bring up the *Ammonite*, and other Shells, ſuch as, it is plain, were heretofore brought up by the Deluge and never ſince.

A Corollary relating to the prodigious Devaſtation that was made at the Deluge.

From theſe Shells, found in ſuch great Numbers, and of ſuch various Kinds, in Places far diſtant from any Sea, even to the Tops of the higheſt Mountains, and the Bottoms of the deepeſt Mines, which neverthleſs, as has been noted, are generated only in the Middle of the Ocean, and are never found near the Shores; from theſe, I ſay, it is manifeſt, what great and ſurprizing Changes were then made: and with what Tumult and Confuſion, dreadful beyond all Deſcription and Imagination, all Things were toſs'd and hurl'd about; which they certainly never had, but for ſome moſt weighty Cauſe, ſuch as was that of bringing on the Univerſal Deluge.

4. *Dr.* Camerarius *judges from Shells, ſmall, and not arriv'd at full Growth, found in the Earth with thoſe that are large, and grown, that both were produced there; but without juſt Grounds.*

4. It frequently happens, that, with the large and full grown Shells of Sea Animals, there are digged up others of the ſame Species, but ſmaller, tenderer, and not yet arriv'd to Maturity, or their juſt and compleat Bulk. From theſe, eſpecially of the ſame Magnitude, and Maturity, to which they uſually arrive about the End of May, and from ſuch Vegetables as we find in many Places in the Earth arrived to the State they uſually attain by the ſame Seaſon of the Year, from theſe, I ſay, I could certainly form a Judgment of the Time of the Year when the Violence of the Deluge coming on put an End to the Growth of both *. There are alſo digged up at Land, as well as found at Sea, *Shells*, full † grown that yet are *thin* and *tranſparent:* and others alſo, which, by Length of Time are become tender and friable, as tending towards Decay, and finaly to Deſtruction; but that any are ever found, in the Earth, which even the moſt quick ſighted Perſon, *by only looking*

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* *Nat. Hiſt. Earth.* Part III. *and* VI.

† *Diſſert. of Dr.* Camerarius. *p.* 226.

on them, can diſcern to be ſtill in a Way of growing, tho' Dr. *Camerarius* affirms this, I dare be bold to aſſert the Contrary. If he has any ſuch Shells by him, from which he thinks he can demonſtrate that, I do not ask him to ſend any of them over to me, which might be troubleſome, but I may at leaſt expect he ſhould ſet forth ſome of thoſe Signs from which he makes that Inference. For if he can ſhew any ſuch, I will immediately publickly confeſs my ſelf miſtaken in my Obſervations, about theſe Things, and that I have err'd in my Judgment concerning them, I will come over to his Opinion, and moſt willingly embrace the Truth he ſhall ſo demonſtrate.

5. Shells, digged up in other Countries, in as great Plenty as in England.

5. The learned *Camerarius* indeed the more willingly admitts *, *that great Plenty of Shells* may poſſibly be digged *up in England*, becauſe it is an *Iſland every where* † *ſurrounded by the Sea*, from whence he ſuppoſes thoſe Bodies to have been carried thither through *ſome ſubterraneous*

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* Page 282. † Page 347.

ous Paſſages, by Inundations, and violent Changes, which he fancies it has undergone; of which I ſhall ſay ſomething hereafter; but he denies [*], that any Judgment can be made *of the State of other Countries, from Arguments* fetched *from that Iſland.* He elſe where ſays [†], that in the Midland Parts, eſpecially of larger Countries, a like Quantity of them is not to be found. But how unadviſedly theſe Things are aſſerted, tho', by a Perſon very intelligent in other Things, all the moſt Antient, as well as the Modern Writers unanimouſly teſtifie; the unqueſtionable Accounts which I my ſelf have procured from the moſt inland Parts of, *Aſia*, *Africa*, and *America*, as well as *Europe*, clearly ſhew: and laſtly the Things themſelves, the Bones, Teeth, and Shells, of Marine Animals, of which, together with many other Things, I have by me great Numbers, collected there, and brought thence hither, give abundant Proof.

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[*] Ibid. [†] Page 282, 290, 347.

Dr. Camerarius's *ſtrange Inconſiſtency in this Affair.*

But why do I endeavour to confirm, by the Teſtimonies of others, what he confeſſes to have obſerved and found Himſelf? For he ſays, in another Place *, *there are whole Mountains in Germany, which appear to be nothing but Shells*: and that particularly about † *Echterding*, great Numbers, and variety of them, are found. And ſoon after he mentions ‡ whole *Mountains*, *all whereof conſiſt of Stones figur'd or caſt in Shells*, *and which are*, as it were, *formed* and compil'd *of them*. Theſe are his own Aſſertions of the Plenty of Shells, and of Stones moulded in them, found *in other Countries*; a Plenty of both no way inferiour to what are any where to be found in this our *own Iſland*. Theſe Things are indeed ſo contradictory one to another, and his own Repreſentations of Fact ſo totally inconſiſtent with this his Opinion and Doctrine, that how they can be eaſily reconciled I am not able to ſee; he muſt look to that himſelf. But tho' Shells abound ſo much in

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* Page 293. † 297, 298. ‡ 338.

thoſe Parts, that whole Mountains ſeem to be made up of them, yet he could find no Remains or Traces of them about * *Tubingen.* But what follows from thence? Does he believe, he, or any one elſe, has ſo carefully ſearched theſe Parts too, as to be ſatisfy'd there are not ſtill ſome that may lye concealed there, and be, ſome Time or other, at laſt diſcovered? Or what if, by Length of Time, and having lain in a Soil containing Salts, detrimental, and gradually deſtructive to the Texture of ſuch Bodies, they are long ſince periſhed? Or finally what if None at all were ever lodged in thoſe Parts? For I have not any where ſaid, nor can it indeed be thought, that they were left in all Parts of the Earth, eſpecially ſince in ſome they are ſo accumulated, and heaped up as to compile whole Mountains. A little lower, as becomes a Man ſo ingenuous, he confeſſes, *there offered themſelves to his View Myriads of ſmall Shells*, lodged very deep in the Earth, in thoſe very Places *about*

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* Page 283.

about Tubingen, but, as he believes, *not of Marine Origin. And he wonders,* nor indeed without Reaſon, *that ſuch Numbers of them ſhould be found at ſo great a Depth in the Earth,* ſince they muſt have been, ſome Time or other, carried out of their Native Seats, and by ſome means or other lodged there. So that, altho' thoſe Shells were not really of Marine Origin, of which yet there is not the leaſt Reaſon to doubt, becauſe the River and Terreſtrial Kinds are very light, and ſeldom or never found at ſo great a Depth in the Earth, yet they prove at leaſt, that the Earth, ſo far, has been violently diſturb'd, and ſuffered great Changes. But *he* * *enquired of thoſe who break and draw up Myriads of Stones out of Quarryes, and they were all alike ignorant of ſuch figured Bodies, except one, who declared, he had twice or thrice found a ſmall Shell in the Stone, the Shape of which he did not remember.* But if one or two ſuch Shells were obſerved by a heedleſs

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* Page 284.

leſs Digger, it is to be believ'd, many more might be diſcovered by thoſe who look more diligently after them. For neither may we depend, more on the Diligence or Curioſity of theſe Diggers whom he rightly calls * rude *Labourers*, than of thoſe † *Divers*; both of which uſually have their Mind, and Eyes, moſt intent upon that which they are in Search of, and, even tho' admoniſhed, are blind to the Reſt. If any one therefore would be ſurely inform'd of the Truth of Things of this Nature, he ſhould, while others digg, examine the Places, and carefully ſurvey, with his own Eyes, what they digg up. *But when perhaps others may diſcover theſe Things, at leaſt about the Neibourhood of Tubingen, by greater Diligence than ordinary, they are abruptly called away from thence in the midſt of the Search* ‡. Which indeed I then begun to ſuſpect, when I ſaw he denied that he found any Shells there of Marine Origin; nor do I indeed doubt but, if at any Time he would ſearch the ſame Places again, and only uſe greater Diligence and Patience without ſo *ſudden* an *Interruption*, he may find great Plenty of them. But let us proceed to what next follows. *In all our Journey, over ſo many Mountains, in* Switzerland, *and* Valois *and the* Alps, *and Chains of Hills, we met with nothing at any Time figured in that Manner, tho' we looked over innumerable Stones, on the higheſt Ridges of the Alps, particularly of great* Bernardus. This he tells us *p.* 284, and not much after, viz. *p.* 297, he atteſts that Shells of many Kinds, Univalves, and Bivalves, are to be ſeen in Abundance on the Mountain *Randus* in *Switzerland*, and in Places every where round about it. Now to deny, in that Part of his Diſſertation, that any Shells were to be found in thoſe Places; but to acknowledge in this Part of it that many and various Kinds were found there, made equally for his purpoſe. This great Man might * indeed have properly inform'd form'd his Readers, upon this Occaſion, that he *had not yet ſeen* the learned Dr. *Scheuchzer's Book on that Subject*, if that Book had been publiſh'd in ſome remote and more obſcure Part of Europe. But ſince that Book had been abroad nine Years and more, before Dr. *Camerarius* had wrote on the ſame Subject, and deſervedly gained its Author ſo great a Reputation, that he then firſt obtained, among the Learned, the Title of the *Helvetian Pliny*, the learned *Camerarius* might certainly, I do not ſay he ought to have *ſeen it.* If indeed *he had ſeen it*, I do not in the leaſt doubt but, that if he had not immediately changed his Opinion, he would not have defended it ſo ſtrenuouſly, after he had conſidered the great Number and Variety of Marine Bodies found in *the Mountains of* Switzerland, and other Places, and delineated and deſcribed *in that Specimen of Dr.* Scheuchzer'*s Lithographia Helvetica*, publiſhed at *Zurich* in the Year 1702.

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* Page 276. † *Conf.* pag. 14. *ſupra.*
‡ Page 284.

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* Page 284.

6. Of the Origin, and Formation, of the Conchitæ, *and other like Bodies.*

6. I ſaid that at the Time of the Deluge, while Shells, ſuſtain'd and upheld in the Waters, floated, together with Sand, and other the conſtituent Matter of Stone, Flint, Spar, and all other Minerals, reduced to their primary Particles, the diſſolved Matter of theſe, entering the Shells, filled them up, ſo that they gave their own Form, or Figure, to the Matter ſo received into them, and were as *Matrices*, and *Moulds* to it: * that of theſe Shells, whether ſo fill'd or empty, ſinking together with the Matter of Stone, Clay, Chalk, and all the reſt that this terreſtrial Globe is compos'd of, are made thoſe Strata, of which this our Earth conſiſts: that the Strata of Mountains afterwards, being laid open by the Force of Rains, Torrents, and Accidents which often happen in all Parts, were broke up, and the Shells contained in them, which lay uppermoſt, with ſome which lay deeper, were thrown out, and left expoſed at the

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* *Nat. Hiſt. Earth.* Part. II. *and* IV.

Surface: [†] that at length thoſe Shells, ſo laid open, thrown out, and expoſed, were worn away, or broke, but the Matter encloſed in theſe Shells, whether Stone, Flint, Spar, or any other, of a Conſtitution firm and ſolid, did ſtill retain, and repreſent the *Concave*, [‡] *or interior Form* of thoſe Shells, in which it was moulded. *This*, from an accurate and often repeated Examination, and diligent Conſideration of theſe Things [*], *I aſſerted to be the true Origin of the* CONCHITÆ, COCHLITÆ, ECHINITÆ, and other like Bodies. But here this very learned Man profeſſes *himſelf unable to comprehend theſe Matrices, theſe Moulds.* [†] *For theſe figured Stones bear the outward Form of the Shells; not the inward, which they plainly ought, if they were formed in the Hollow of them.* Now theſe *Matrices and Moulds*, which he could not yet comprehend, I believe he eaſily may hereafter, if he will only look into theſe Matters, a little more carefully. For my own Part I have

Dr. Camerarius's *miſtake in this Affair.*

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[*] Ibid. Part 4. [†] *Diſſert.* p. 338. [‡] Ibid. Part. 5.

have Nature my Guide in this whole Affair; and ſince I have offered Nothing, at any Time, but from the Things themſelves, and have relyed wholy on Obſervations of the ſame made with the utmoſt Accuracy, I now appeal to them and to Nature; and, as of all other Naturaliſts, ſo eſpecially to the Obſervation of the learned *Camerarius* himſelf on theſe Things, but made with more Care than hitherto. If indeed he had uſed ſuch Care and Diligence before, he would certainly have had no Cauſe to enter into a Controverſy on this Subject. For among Thouſands and Myriads, of thoſe Bodies, which are found in their Places, I dare take upon me to ſay he would not find one Stone, or Flint, which *bears* the Convex or *outward Figure of the Shell.* If he ſhall find any ſuch hereafter, I will then admitt the Force of this Objection, and yield up my Opinion to it.

Occaſionally of the Cavities in Stone form'd after the Model of Shells:

One Thing indeed there happens in ſome Places, which is not here to be paſſed over. When Water, containing in it Vitriol, or other like Salts, pervades any Strata, it diſſolves the Shells lodged in ſuch Strata by little and little, carries their diſſolved Particles away with it, and leaves the Spaces, before filled and poſſeſſed by thoſe Shells, empty. Examples of this are to be found in almoſt all Parts of the Earth. To ſay Nothing of other Places, there is here, in *Portland*, an huge Stratum of the hardeſt Stone, in which may be obſerved an infinite Number of ſuch Cavities, or vacant Spaces, repreſenting to View both the Shape, and Size, of Turbinated Shells, and Bivalves. Into theſe Cavities if there be poured melted Lead, or any other Metall, it will always take the moſt exact Figure of theſe Shells. *and of Spar*, &c. *formed in the Shape of Shells*, &c. So where it happens, that the Water, paſſing through, carries with it, beſides ſuch Salts, Particles of Spar, or other Minerals, it frequently lodges them in thoſe Cavities, and there leaves them till at laſt it fills them up. Wherever this happens, it always follows, as of Neceſſity it muſt, that the Matter of Spar or other Minerals ſo formed, exhibits and repreſents the very Sizes, and perfect Figures, interior, and exterior, of the

Shells whoſe Places it had filled. Nor are there ſeldom found *Conchitæ*, and other Stony and flinty Bodies of that Sort, at length caſt out of the Strata, incruſted with the Subſtance of ſuch Spar, and other Minerals, ſupplying the Place of the Shell that is worn away, and deſtroyed. If Dr. *Camerarius* means theſe Incruſtations, as I think he does not, I was not treating of them; nor indeed do theſe make out what he would demonſtrate, but rather ſhew the Contrary. For if theſe Incruſtations are broken off, the Surface of the Stony Matter, contained within, exhibits the *interior* Figure of the Shell, in which it was firſt moulded, as exactly as thoſe other Stones, which remain ſtill covered with the Shells; which ever bear the Impreſſion of the *interior* Surface of the Shells, after the Shells themſelves are decayed or conſumed.

7. *Dr.* Camerarius's *Objections, as to the Site of Shells in the Earth, refuted.*

7. But I come now to that part of the Book, where Dr. *Camerarius* treats of the Order wherein theſe Bodies are found lodged in the Earth. He is not forward to admitt any Thing that I have offered on this Subject.

ject. For to what I had writ he returns,---- * *Theſe Things indeed carry a great Shew of Proof as to what relates to Crabs and Lobſters,--but demonſtrate Nothing with Reſpect to the* BUCCINA, *and* CONCHÆ VENERIS; *ſince theſe are found ſo very numerous on the Shores, and have not the ſmall ſpecifick Gravity of Crabs, and therefore were not lodged in the upper Strata, ſo that they ought to have been found in the lower.* I am realy very much concerned when I cannot make this learned and ingenious Gentleman's Obſervations, of Things, which require no great Study, but only common Senſe, and a meer View of them, comport with my own, which were not made without due Diligence and Conſideration. I have made Tryals of many Crabs, as exactly as poſſibly I could; and found ſome of them anſwer to Water, in Specifick Gravity, as 1 ¾, to 1, and others as 2 to 1. But I have obſerved many of the *Buccina* that have not the Proportion of 2 to 1, and but few that exceed that Proportion. For the *Concha Veneris exigua alba ſtriata*, this has the Proportion of 1 $\frac{5}{8}$. Theſe therefore coming ſo near the ſpecifick Gravity of Crabs, we cannot expect to find theſe more commonly than Crabs. But laſtly he ſays, *the* BUCCINA, *and* CONCHÆ VENERIS, *occurr in very great Numbers on the Shores.* There are indeed ſome few of the *Buccina*, and but only one Species of the *Conchæ Veneris*, which is that which I mention'd above, to be found on the Shores of our Iſland: and only a very ſmall Number on any of all the Shores of *Europe*.

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* Page 290.

Of the Situation of Metalls, and Minerals, in the Earth.

Nor indeed is he leſs doubtfull in his Opinion concerning the Order of Metals, and Minerals, and their Diſpoſition in the Earth. * For he thinks the *Moleculæ*, or *minuteſt* Particles, of Metalls and Minerals, too heavy to have been *ſupported in the Water*, or mingled with the Matter of the *Strata of Stone*, ſo that they ſhould have been *precipitated down*, ſo as to conſti-

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* P. 307. 309. 325.

tute the loweſt Stratum of all, and to reach the very *Centre of the Earth.* But the Things themſelves, and the daily Experience of Chymiſts, afford Arguments ſufficient againſt this Opinion of his. For who knows not, that Gold and Silver, which are not the lighteſt Sorts of theſe, are ſuſtained in *Aqua regia*, and *Aqua fortis*, ſo as not to ſink to the Bottom? This is a ſufficient Anſwer to Dr. *Camerarius.* Nor indeed is it here to be enquired, how ſo great an Abundance, as well of ſeparate Particles, as of Nodules, or Lumps of Metallic or Mineral Matter, became repoſited in the *Strata*, among Sand, and other lighter Matter. This is a Subject foreign to the preſent Inquiry, as I had intimated to my Readers, *Nat. Hiſt. Earth.* Part. 4: and therefore Dr. *Camerarius* ſhould not have wholey neglected that Admonition of mine.

Of the Site, and Order, of the Stony and terreſtrial Strata.

He moreover denies, * *that Order, Diſpoſition, and Diſtinction of the Strata, with the extraneous Bodies contain-*

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* P. 291.

contained therein, according to their ſpecifick Gravity, to be commonly obſervable. But on what Argument does he chiefly rely when he does this? From what Example of the Things themſelves does he endeavour to demonſtrate the contrary? Why truly from what *Mountfaucon* has ſupply'd him with from *Ramazini*. But, when he objected this to me, he ſhould have ſeriouſly conſider'd with himſelf, what thoſe learned Men thought of the Strata about *Modena*, † who believe *thoſe Strata were not from the Deluge, but were formed at various Times by the Mud of Rivers.* Whether this be true, or falſe, I do not here enquire; but if Dr. *Camerarius* takes it for Truth, and ſuppoſes that thoſe Strata have been the Work of later Times, and thrown up by the Rivers, then they are not thoſe which we are here treating of, and conſequently make Nothing to his Purpoſe. And therefore he ſhould make Uſe of other Arguments, fetched from other Places. Nor indeed are

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† P. 294.

there ſuch other Places wanting, where he imagins he finds Matter for Arguments of the ſame Kind, and which are not refuted by the Judgment of any One, nor eaſily to be refuted; for Example, * *The Quarry of* Biberax, *and other Quarrys, and the Pits that are dig'd thereabouts, contradict my Opinion, which preſent ſometimes to View Strata of Earth, ſometimes of Sand, ſometimes of Clay, and ſometimes of Stone.* In Caſe I believe and acknowledge theſe to be ſo, depending upon his Fidelity and Diligence, which indeed I eaſily do, becauſe they are often found ſo elſewhere, yet Nothing can be gathered from thence to deſtroy my Opinion, and overthrow the Doctrine I have advanced relating to thoſe Things. He indeed ſays, ‡ *but the very View of the Strata ſhews, they were not formed, and laid one over another, by ſuch an orderly Subſidence, according to their ſpecific Gravity, becauſe then the Strata of Earth,*

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* P. 291.

‡ P. 310.

Earth, *Clay*, *Sand*, *Stone*, *Chalk*, *Marble*, &c. *could not be ſo unequally intermix'd; the lighter Stratum being often ſound under the heavier.* But this he ſeems to aſſert only upon Conjecture, and Obſervation of the various Conſtitution of the Strata; becauſe he does not ſay that he has made any accurate Experiment of this, nor that he has made Tryal of the Specific Gravity of any Stratum, and found the Matter of the under Strata to be lighter than that of the upper. But, if he had done ſo, and found Things in that Manner, yet he could by no Means thereby have made out what he thinks demonſtrated without any Examination at all either of himſelf, or any One elſe. For that unequal Order of the Strata does not in the leaſt affect my Doctrine of the Subſidence of the diſſolved Matter of the Earth. For that Doctrine is Supported by the Evidence of Bodies brought from the Sea into thoſe Strata, and now found in the ſame all over the Earth, a Proof the moſt certain that could be required. I ſay thoſe Bodies, bred in the Waters, which are now found in the Strata, lodg'd among Earth,

The Origin of the Strata aſſerted from the Shells and other extraneous Bodies contained in the Strata. Their conſtituent Matter once diſſolved, and ſuſtained in the Waters.

Earth, Chalk, Sand, Stone, and all other Matter, as well that which is now more looſe, as that which is more ſolid, of which thoſe Strata conſiſt: and the Order and Condition in which thoſe Bodies are found, plainly ſhew that Matter to have been once * all in a State of Solution, all ſuſtained in the Waters, and at laſt, ſubſiding in thoſe Waters, formed thoſe Strata. It is not here material to enquire how that Diſſolution was effected; it ought to ſuffice, that the Thing is certain, that there are every where extant Proofs of it ſo manifeſt that if any One, I will not ſay inſtructed in even the firſt Rudiments of Natural Philoſophy, but who has only common Senſe, and the Uſe of his Eyes, will but go into the next Quarry, he cannot but immediately acknowledge the Matter to be actually ſo, which thoſe who ſit contriving Hypotheſes in their Studies, deny to be poſſible. From ſuch a Contemplation of Things, and Obſervation of the Strata in the Earth, it was

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* See *Nat. Hiſt. Earth*, Præelim. Diſſert. and Part 2.

was, that the ‡ moſt antient Philoſophers believed, and taught, *the Earth to be* Nothing elſe but *the Sediment and Dreggs of Water*.

Now theſe Things being proved according to Reaſon, and demonſtrated even to the Eyes, I deſire to know of the moſt ingenious *Camerarius*, what he thinks was the Cauſe, why thoſe Marine Bodies, together with Sand, and other Matter, diſſolved, and floating in the Water, ſhould ſink, and be formed into ſuch Strata? For my Part I think their Gravity was the Cauſe. And if that Matter, and thoſe Bodies, owe their Subſidence to Gravity, it is neceſſary that thoſe Strata themſelves ſhould obey the Laws of Gravity, and be diſpos'd and formed according to the ſame Laws. If he would overthrow my Doctrine on this Subject here he ought to begin: this its Foundation ſhould be undermined. For thus I wrote when I treated of this Matter, and

That Matter being brought to ſubſide by its own Gravity, the Strata were compoſed of it. The Laws and Order of that Subſidence.

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‡ Τὴν μὲν γῆν ὑπόστασιν εἶναι ϗ τρύγα τȣ͂ ὕδατος. *Metrodorus apud* Plutarch. *de Placit. Philos.* Lib. 3. *c.* 9.

and never argued otherwiſe any where elſe; * *This Subſidence happened generally, and as near as poſſibly could be expected in ſo great a Confuſion, according to the Laws of Gravity.* For in ſuch a Confuſion of Matter diſſolved, it could not be imagined that the Subſidence ſhould be every where alike, or the Strata, thereby compoſed, always placed in the ſame certain Order. They therefore who look for that, look for what I never promiſſed to ſhew them. But when they read my Writings without due Attention, they thence frame Laws of Nature, as if conceived according to my Opinion, and deviſe to themſelves a Sort of Fabrick of the Earth exactly according to thoſe their Laws; and if any of them, entering upon that Fabrick, find thoſe Laws not juſtly obſerved, they immediately pronounce mine wrong and miſtaken. But to return to the Matter in Hand; this is moſt certain, the Subſidence could not be every where uniform, and the ſame. Nay it was neceſſary, it ſhould vary, in every Place, according as the Quantity of Matter ſuſtained, anſwered to the Quantity of Water that ſuſtained it: as the Water itſelf was more troubled, or more calm: as each Body ſuſtained was greater or leſs: as there were more, or fewer, of any Kind, in the ſame Place: and finally, as the Place, where each Body fluctuated before it began to ſink, was farther from, or nearer to, the Bottom, and as the Courſe of its Deſcent was longer or ſhorter. For it could not otherwiſe happen but that a Particle of Matter, however light in itſelf, floating within ſome few Feet of the Bottom, when Things began to ſettle, muſt reach the Bottom much ſooner, and ſo lye deeper in the Earth, than another, tho' much heavier, which floating perhaps a thouſand, or more Paces above, began to ſink at the ſame Time. * It is therefore

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* *Nat. Hiſt. Earth.* Part 2. Conſect 3.

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* *This Argument is more accurately treated of in that Chapter of my greater Work, Part of which the ingenious and learned Dr.* J. Harris *has inſerted in his Book, entitled,* Remarks on ſome late Papers relating to the Deluge, and to the Natural Hiſtory of the Earth. London *publiſhed, in the Year* 1697. 8vo.

therefore neceſſary, tho' we ſuppoſe this whole Affair to have been tranſacted exactly according to the Laws of Gravity, that a great Part of that Maſs ſhou'd ſink promiſcuouſly, and confuſedly, and be laid without any certain Method: that the Conſtitution of the Strata ſhould be various, and uncertain: and that therefore lighter Bodies ſhould be often found lodged under heavier. * 'Tis moſt evident that only that Matter, and thoſe Bodies, which, when Things began to ſettle, were higher, and fluctuated nearer to the Surface of the Maſs, and had conſequently a longer Deſcent to make, † could be diſpoſed into any certain Method and Order. It was alſo neceſſary that theſe ſhould ſink laſt; and ſo conſtitute the upper Parts of the Globe, and thoſe neareſt to its Surface. Hence the Reaſon is plain why the Strata nearer the Surface of the Earth, and the Marine and other Bodies found therein, lye in better Order than thoſe placed

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* Conf. Part 2. Sect. 5. *infra.*
† Ibid.

placed at a great Diſtance lower. But this more uniform Site of the upper Strata, and the Diſpoſition of the Bodies therein, I would have underſtood only of thoſe Places where the upper Strata, after the Subſidence of the Matter, and Conſolidation of the Earth, were not removed, and born away. For I ſhall elſewhere ſhew, by many remarkable Inſtances, that they were in ſeveral Places ſo removed, and born away, by the Force of the Waters returning from off the Earth, at the Concluſion of the Deluge. The Matter ſo forced away was thrown elſe where, and there laid without any certain Method, or Order. And truly this ſeems to be the State of that Tract of Land about *Modena*, * where Things lye as the Current of the Water, ſo returning, diſpoſed them. In like Manner great Quantity of Gravel, Land, and other Matter lyes promiſcuouſly, in ſome Places, at the Surface of the Earth, nay even to very great Depths, as well in *England*, as in all other Countrys.

The Strata, ſince the Time they were formed, have ſuffered ſome Changes; 1. the upper ones by the Return of the Waters after the Deluge:

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* See P. 35. *Supra.*

Countrys. But for the Strata themſelves from which that Matter was then taken away, and ſo by that Means were uncovered, and now appear bare, and on the very Surface, which before lay under all that Matter, theſe Strata, I ſay, commonly preſent to View Things laid perplexedly and confuſedly together, and that for the Reaſons above aſſigned.

2. the lower Strata, by the Removal of Metallic and Mineral Matter.

Beſides which, from the unequal Subſidence of the diſſolved Matter, there muſt of Neceſſity be an Inequality alſo of the Strata; the Strata themſelves, ſince the Time they were firſt formed, and compacted, have apparently not remain'd in the ſame State, but undergone conſiderable Changes. To ſay nothing of the other Matter of them, I will only recite here what I have ſet forth in my *Nat. Hiſt. of the Earth.* Part IV. Conſect. II. *There have and do ſtill happen Tranſitions and Removes of the Metallic and Mineral Matter, from one Part of the ſame Stratum to another: and from the lower Strata to thoſe which lye above them.* From which Tranſitions of that Matter, and Changes of it's Places, the Gravity alſo of the Strata themſelves muſt neceſſarily have been changed too. For that heavier Matter, being extracted and removed, leaves its own Strata lighter: and adds to the other, into which it has ſhifted, the Gravity taken from the former. So that from the Gravity of the Strata as they now are, a certain and exact Eſtimate of their original Gravity, cannot always and every where be made; eſpecially in Countrys which moſt abound in Metalls. For, in others, the Strata retain their primitive and original State, if not entire, yet much leſs changed.

Yet in many Places Foſſils are found diſpos'd, with a wonderfull Exactneſs, according to the Laws of Gravity. Examples of this.

This, as in other Parts of our own Country, *Britain*, may be obſerved in thoſe Parts particularly of the Counties of *Gloceſter*, *Oxford*, and *Northampton*, where Metalls and Minerals leſs abound: where the Strata of Stone, and every other Matter, are found diſpoſed according to their reſpective Gravity, ſo that they ſeem to have retained their primitive Conſtitution to this very Day. Some Examples of this are now lately ſet forth in the learned Mr. *Morton*'s *Nat. Hiſt. of Northamptonſhire*, a Work of many Years Labour, no way inferior to any of the Kind, and which will give abundant Proof, to all who are Judges of theſe Studies, of the Author's unwearied Diligence and uncommon Knowledge in Natural Things. It is alſo farther to be obſerved, that thoſe Counties, being very remote from the Sea, did not ſuffer ſo much Damage by the Return of the Waters at the End of the Deluge, and in many Places fewer of their upper Strata were born away. There are indeed many other Things which might be offered here relating to the Subſidence of the terreſtrial Matter, and the Formation, and Diſpoſition, of the Strata, which, had I not already exceeded the intended Bounds of this Treatiſe, I might produce here. But I ſhall quit this Subject after I have only put the learned *Camerarius* in Mind of one or two very remarkable Inſtances of lighter extraneous Bodyes, found among lighter Terreſtrial Matter, and of heavyer lodged among heavyer; which indeed ſeems to be of great Moment towards putting an End to this Controverſy, and which I have formerly mention'd in my *Nat. Hiſt. of the Earth. Prælim. Diſſert. verſus fin.* In ſeveral Countyes of *England*, e. gr. *Kent*, *Surrey*, *Eſſex*, *Hartfordſhire*, *Berks*, and *Oxon*, there occur almoſt every where many and vaſt Strata of Chalk. To theſe, which are ſufficient of themſelves, I could add other Places, not only in our Iſland, but in foreign Countryes alſo, where Chalk much abounds, in all which great Numbers of Shells, and other marine Bodies, very different indeed from one another, both of the Turbinated Kinds, as alſo of Bivalves, and Echini, are found; yet all theſe are ever of the lighter Kinds of Shells, and ſuch as come neareſt the Specifick Gravity of Chalk. But in Strata of Stone, a Matter much heavier than Chalk, only the heavier Shells are found, and that too in not leſs Numbers or Variety. If any one ſeriouſly conſiders this, which could neither fall out by Chance, nor any other Means than what I have aſſign'd, I can hardly think it poſſible, but he may of himſelf from hence reſolve all his Doubts as to this Matter. Another Argument,

ment, for this, may be taken from the Cruſtaceous Kinds of Marine Animals. It could not be otherwiſe, but that Crabs, Lobſters, and other Animals of the Cruſtaceous Kind, muſt be caſt out of the Sea, with thoſe of the Teſtaceous. But, tho' the former are ordinaryly the bigger, and, were they now extant, would be more eaſily found, yet I have almoſt every where met with Thouſands of the Teſtaceous, without having been hitherto able to find, with the utmoſt Diligence, above five or ſix Remains of the Cruſtaceous, or to procure them from any other Part of the Earth. Nor indeed does this ſeem ſtrange to me; nay I ſhould rather wonder if it happened otherwiſe. For thoſe Cruſtaceous Kinds, being lighter than Chalk, and almoſt every other Sort of terreſtrial Matter, and ſo ſubſideing laſt of all, muſt lye upon the Surface of the Earth, expoſed to the perpetual Injuries, of the Weather, Rain, and other Caſualties, till being totally decayed, and rotten, they left behind no Signs of their ever having been there. Nor indeed is this any Thing other than what I wrote before, in my *Nat. Hiſt. Earth*, *Prælim. Diſſert. in fine*, and *Part* 2. *Conſect.* 3. which Paſſages and ſome others, if the learned *Camerarius* had more carefully attended to, I cannot ſee that he would have had any Grounds to have raiſed a Controverſy on this Subject.

8. Of the Growth, and conſolidating of Stone.

8. In Oppoſition to my Opinion of the Origin of the Strata, the learned *Camerarius* ſuppoſes Stone to grow; of which if he can give any Proof from the Thing it ſelf, he ſhall no longer find me tenacious of my Opinion, or defending my Doctrine, but I will immediately give up both to the Truth which he ſhall ſo demonſtrate. Therefore he ſhould exert himſelf, to find ſome Argument in Confirmation of his Opinion. Let him turn over his Common-place-book to ſee if he has any Examples of this Growth, which he ſpeaks of, obſerved by himſelf, or any other. Let him ſearch all his own Country, *Germany*, if he thinks he can find any Proof of this. But if he is diſappointed in all theſe, let him make Enquiry of the ſame in any other Part of the Earth. Yes truly he has a moſt certain Proof from the

Things themſelves, every where to be found, both at Home, and Abroad, and obvious to any one. For when I aſſert that *there is no Inſtance of Strata of Stone growing gradually more and more hard,----ſo as, by Degrees, finally to attain a complete ſolidity*, *Dr.* Camerarius [*] *thinks that Examples occurr very frequently, not only in* Germany, *but in other Places, of Stone of a ſofter Nature while in its Quarry, and which muſt therefore be wrought as ſoon as drawn out, becauſe otherwiſe it would be wonderfully hardened by lying ſome Time abroad, expoſed to the Weather. Examples* of this Matter are indeed very frequent; but does he fancy this will prove, *that Stone*, in its Strata under Ground, *grows gradually more and more hard*, and by little and little attains a complete Solidity? He had ſurely ſomething elſe in his Mind when he wrote this. For if Stone, drawn out of its Quarry, and expoſed to the Air a long Time, does actually become hard, can he think it thence follows that they do the ſame while they lye in their native Seats down in the Quarrys, expoſed to no ſuch external Cauſes to harden them? This indeed I could not have in the leaſt expected, nor have believed to have been ſo eaſily received by ſo great a Man, and one ſo acute at cenſuring the Writings of others. Did I ever deny that Stone, when drawn out of the Strata, becomes harder? Who was ever ignorant of this? I had actually made mention of the ſame Thing before [*], not as a Matter firſt diſcovered by my ſelf, but to give the Reaſons of that Hardening, which perhaps the Generality of Readers had not obſerved, and which alſo ſeems to have been the Caſe of this learned Gentleman when he wrote againſt me. For in my *Nat. Hiſt. of the Earth*, *Part* 3d, and 4th, treating of the great Plenty of Water in the Earth, and the Power it has to inſinuate it ſelf, I ſaid ſcarce any Stone, nor indeed any Marble, is ſo cloſe, that the Water does not at leaſt ſo

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[*] P. 315.

Stone, in the Earth, ſaturated by Moiſture there and ſoft, being at length expoſed to the Air, and dryed, becomes harder.

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[*] *Nat. Hiſt. Earth.* Part 3. Sect. 1. Conſect. 8.

ſo far penetrate, and pervade it, as to inſinuate it ſelf into its Pores, and even moiſten it throughout. So that all Kinds of Stone, while in the Strata, muſt of Neceſſity be leſs ſolid, and hard, than after they have been long digged out, and dryed by the Air, and Sun.

The Argument, concerning the Vegetation of Stone, taken, from Dr. Tournefort's *Obſervations, conſidered.*

But this Argument, fetched, as he fancies, from the very Nature of Things, he endeavours to confirm by the Teſtimony of the learned, and deſervedly famous Dr. *Tournefort.* Out of his Obſervations Dr. *Camerarius* produces what follows, *In the Cave which is called* Antiparos, *Dr.* Tournefort *ſaw a new Sort of a Garden, with Variety of Plants, of Marble*[*] *ſtill growing, ranging into Beds, and Species, and which, from all the Circumſtances of their Formation, could not but have grown after the Manner of Vegetables.* p. 315, 316. What ſhall I anſwer to this Remark of an Eye Witneſs? I readily acknowledge him to be a moſt skillful Botaniſt, as he has applyed himſelf to thoſe Studies, much to his own Honour and the publick Advantage; but he has acted ſomewhat unadviſedly, and extended too far the Bounds of thoſe Studies, when, in an Account of Vegetables, their Nature, and Properties *, he adopted Stones into the ſame Family. Among the many Calamities of the long and tedious War, may be juſtly reckoned the Hinderance to all mutual Commerce of Literature, when but few French Books, as well as other Commodities, could be brought over to us, or few of ours ſent over to them, and thoſe only privately. Whence it is no Wonder if my Book was not carried thither, or at leaſt never came to the Hands of the learned Dr. *Tournefort*, which I readily believe. For had he ſeen that Book, he had found what he treats of, accounted for by me. For he might have there learned, that it was not the *Stone* it ſelf that was in a Way of Growth in the Garden, but *Spar* affixing to the Stone, in that moſt beautiful Order.

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[*] Of Stone, Pierre. *M.* Tournefort's *Mem. de l'Acad. des Sciencés.* 1702. p. 221.

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* *Mem. de l'Acad.* 1708. p. 151.

That the Thing realy was ſo appears from Dr. *Tournefort*'s own *Deſcription* * of it. And he himſelf might have immediately diſcovered this, at firſt Sight, had he been more uſed to make Obſervations under Ground. For there *white* Spars are commonly found caſt and fixed upon the Strata of *grey* and other coloured Stone; as appears in almoſt every Cavity, and Fiſſure, where Water pervades, and ſparry Matter, or that of which Spar conſiſts, abound. And I not only have ſhewn, that Spars *grow* exactly after this Manner, but have ſet forth in the 4th Part of that Book, the Reaſon of their Formation, and the Order of their Growth. When therefore the celebrated *Camerarius* thus confounds Bodies, in their Nature and Original very different from one another, and takes the Growth of Spars in the Fiſſures of the Strata, for the Growth of Stones and Marble which conſtitute the Body of the Strata, he is ſo far from producing any Thing, as he imagines he does †, againſt *my Syſtem, and the Account I give of the Origin of all Stones*, that he repreſents my Doctrine very ill, if not invidiouſly, and diſcovers his own Unacquaintedneſs with theſe Subjects. If by Chance his happy Genius, and great Elocution, ſhould draw ſome to be of his Opinion, yet he will not gain many of the more intelligent Readers, at leaſt by the Strength of theſe Arguments.

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* Une eſpece de Broderie, haute d'environ deux, ou trois Lignes.---La Matiere en eſt *blanchatre*, quoique la Pierre d'ou elle ſort ſoit *griſatre*: & je regard comme une eſpece de Calus. M. *Tournefort*, Memoires de l'Acad. des Scienſes. 1702. *p.* 221.

9. Of the Growth of Metalls.

9. *What ſhall I ſay*, ſays Dr. *Camerarius, of the Growth of Metalls, of their particular Way of ripening, their Regeneration, and Generation anew in Glebes long exhauſted, and likewiſe of the Increaſe of pure and ſolid Metall* *? What, learned Sir, you would now, or hereafter, ſay of theſe Things, I know not, nor am able to gueſs. But this I will ſay, when you ſhall demonſtrate any other Opinion, *of the Generation and Growth*

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† P. 316. * P. 323.

Growth of Metalls, contrary to mine on the ſame Argument, I will forthwith embrace it. But, in the mean while, I would ask of you, where I have ever ſaid, *that Water can diſſolve all Metalls*, contrary to all Chymical Experiments †? For unleſs my Memory and Eyes very much deceive me, I have ſaid no more on the Subject than that the Water takes up the Particles of Metall, which lay before looſe, and ſeparate, in the Interſtices, and Pores, of the Strata of Stone, and thence carries them into the perpendicular Fiſſures of the Strata *.

10. *Of the Origin of Cryſtall, and of Gemms.*

10. With the like Candour it is that Dr. *Camerarius* ‡ aſcribes to my Doctrine, *ſo numerous a Cryſtallization, and* Formation of *ſo many Gemms*, in the Waters, at the Time of the Deluge. Whereas, tho' I well knew that ſome Cryſtallizations did then happen, yet, as they were but few, I paſſed them over in Silence. Nor indeed did I then ſo much as mention any one Cryſtallized Body,

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† P. 327. * *Nat. Hiſt. Earth.* Part IV.
‡ P. 326.

except the *Selenites*, and *Echinated Cryſtalline Ball*. But, on the contrary, I declared, as expreſly as I could, that the far greateſt Part of *Cryſtallizations*, and figured *Gemms*, has been produced ſince the Deluge, by Means of Water, in the Fiſſures of the Strata. *Nat. Hiſt. Earth.* Part IV. Conſect. 6, 7, 8.

11. *Water no fit Menſtruum of Sulphur, Oil, or Bitumen.*

11. Another invention of the ſame Ingenious Gentleman is *that Menſtruum of Water, for Sulphurs, Oils, and Bitumen*, which, of his Liberality Dr. *Camerarius* is pleas'd to aſcribe to me. *p.* 328.

12. *The Aſcent of Water to Springs, not owing to the Preſſure of the Strata.*

12. But where did I ever ſay, *the Waters are preſs'd out of the Abyſs by the Weight of the incumbent Strata, and ſo, contrary to the Laws of their own Gravity, riſe up to their Springs* *? I actually aſſign a Cauſe, of this Aſcent, very different from that, but agreeable to Nature and right Reaſon. *Nat. Hiſt. of the Earth.* Part III.

13. The

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* Page 318.

13 *What Supply the Springs receive from Rains.* 13. The learned *Camerarius*, as diſcerning and quick-ſighted as he is, *does* * *not ſee how the Rains can be wholey excluded* from mixing with the Water of Springs, and Rivers. Nor realy do I *ſee* why he wrote this. For tho' I have denied, that they owe their Riſe wholey to Rains, yet I have no where excluded theſe. On the contrary I have, in expreſs Words, declared that the Water of Rains is wont to fall into and mix with that of Springs, and Rivers. *Nat. Hiſt. of the Earth.* Part 3. Sect. 1. Conſect. 4.

14. *Of Earthquakes.* 14. Moreover, when he inſinuates †, that I deny that there ever were TOWNS *ſwallowed up by Earthquakes*, MOUNTAINS *broken*, *Rocks ſunk*, *and new* LAKES *formed*, he does not ſeem to have read what I wrote of theſe, *Nat. Hiſt. of the Earth.* Part III. S. 1. Conſect. 12. viz. *that the Earthquake is ſometimes ſo extremely violent, as to undermine and ruin the Foundations of the Strata, ſo that the whole Tract*

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* P. 320. † P. 303, 339.

Tract ſinks down to rights into the Abyſs underneath,----the Water thereof immediately riſeing up and forming a LAKE *in the Place where the ſaid Tract before was. Several conſiderable Tracts of Land, and ſome with Cities, and* TOWNS *ſtanding upon them, as alſo whole* MOUNTAINS, *many of them vaſtly large and of a very great Height, have been thus totally ſwallowed up.* Nor was there the leaſt Reaſon for him to imagine, from what I have any where written, *that all Earthquakes would be univerſal, if the Waters of the Abyſs were ſo rarifyed, and gave the Earth ſuch Concuſſions* *. For I have ſhewed, that it might, and commonly does, happen, that by the Effort which cauſes theſe Concuſſions, ſome one Tract of Land only is affected, yet ſhould that Effort extend it ſelf further, and act with greater Force, there might be, and actually have been, ſome Shocks, which at leaſt a great many Parts of the Earth, if not the whole Globe, have felt †.

15. Nor

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* P. 322. † See *Nat. Hiſt. Earth.* Part III.

15. *Of the Olive Tree from which the Dove cropped the Leaf ſhe brought to* Noah.

15. Nor does he uſe me with more Candour, where he ſays *, I imagined the Olive Tree from which the Dove croped the Leaf that ſhe brought to *Noah*, to have been that Time *ſwiming in the Waters.* For I wrote nothing like that; but the direct contrary. See *Nat. Hiſt. Earth.* Part VI. In the Strata of Stone, even to the greateſt Depths, are found Leaves, and other Parts, not only of the common and known Plants, but of others that are very ſtrange, and of Kinds whereof there are none at this Day growing in thoſe Countries where theſe are found ſo lodg'd in the Strata underneath. In the very ſame Manner, in moſt, if not in all, Parts of the Earth, Shrubs and Trees are digged up, ſome very large, and many of Species not now found growing in thoſe Places. Nay there are found buried Trees, in great Numbers, and ſome of huge bulk, in Iſlands where the Soil is either ſo barren, or the Air ſo bleak and ſharp, or elſe the Winds there ſo bluſtering and tempeſtuous, as to ſuffer none now to grow

Of Trees, and other Plants, frequently digged out of the Earth.

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* Page 344.

grow there; nor can we learn either from Hiſtory, or from the Accounts of the moſt antient Inhabitants, that any ever did grow there. So univerſal a Devaſtation could never have been effected, without a Cauſe equaly extenſive: and in Truth there are ſo great a Variety of Circumſtances and Phænomena, which plainly ſhew the univerſal Deluge to have been that Cauſe, that there can I think be nothing offer'd in Contradiction or in Objection to the Proof they give. Now tis very remarkable, that theſe Trees are found with their Roots ſtill adhering to them. For this plainly ſhews there was a Diſſolution and Failure of the Ground, where they formerly ſtood and grew. Of this there was alſo a long Tradition among the moſt antient Nations [*]. *Bacchus is by the Naturaliſts taken for the Fruit of the Vine. He is feigned to have been born* [†] *a ſecond Time*

That Havock, of Vegetables, was cauſed by the Diſſolution of the Earth, at the Deluge.

The Tradition of the Antients, concerning that Diſſolution and Havock.

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[*] Φυσιολογοῦντες-- τὸν ἀπο τῆς ἀμπέλου καρπόν Διόνυσον ὀνομάζοντες. Diodor. Sic. L. 3. p. 195. [†] Δὶς δ' αὐτοῦ τὴν γένεσιν ἐκ Διὸς παραδεδόσθαι, διὰ τὸ δοκεῖν μετὰ τῶν ἄλλων ἐν τῷ κατὰ τὸν Δευκαλίωνα κατακλυσμῷ φθαρῆναι καὶ τέλους τοὺς καρποὺς. καὶ μετὰ τὴν ἐπομβρίαν πάλιν ἀναφυέντας. Ibid. p. 196.

Some Paſſages of Holy Writ compar'd and explain'd.

Time of Jupiter, becauſe in Deucalion's *Flood*, (which they uſually confound with *Noah*'s) *the Vine is ſuppoſed to have periſhed with other Trees, and afterwards to have ſprung up a-new.* But we have a much fuller Deſcription both of the Earth's diſſolving, and the falling of the Trees, in *Seneca*, where he treats of his Deluge, *viz* *. *their Roots being let looſe, every Shrub,* in particular *the Vine, fell down, and every Plant loſt its Support in the Ground, which was become ſoft and fluid.---- The Buildings fall and are overpower'd, and the Waters being admitted into the Earth quite to the very deepeſt* and loweſt *parts of it, their Foundations ſink* and fail, *and the whole Earth becomes a Bog. In vain are Things tottering aſſiſted by props, for every Foundation is in a*

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* Nat. Quæſt. Lib. 3. C. 27. Solutis quippe Radicibus, Arbuſta procumbunt & vitis, atque omne virgultum non tenetur ſolo, quod molle fluidumque eſt.---Labant & madent Tecta, & in imum uſque receptis Aquis Fundamenta deſidunt, ac tota Humus ſtagnat; fruſtra titubantium fulcra tentantur, Omne enim Fundamentum in lubrico figitur, & lutoſa Humo nihil ſtabile eſt.

a ſlideing State, and nothing can ſtand firm in Ground ſo quaggy. And afterwards, ſpeaking of the Earth †, he affirms it to have been *changed, diſſolv'd* and reduc'd *to a Fluid:---that it was neceſſary its Parts ſhou'd periſh, and be all perfectly deſtroy'd, that they might be all again formed a new, ſimple and pure.* There had obtain'd an Opinion, amongſt many of the Antients, that the very *Earth* was *corrupted*, and was therefore *deſtroy'd, purified*, and *formed a new*, at the Deluge. This is what the Philoſopher here points at. Perhaps there may ſome Time or other be publiſhed the Paſſages of thoſe antient Writers to this Effect, more accuratly collected out of their Writings, and illuſtrated with Remarks. But thus *Seneca* goes on to deſcribe the *Diſſolution* of the *Earth* ‡, *It therefore begins to putrify, and the Particles*

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† Terram eſſe mutabilem & ſolvi in Humorem.---Partes ejus interire debuerint, abolireve funditus totæ, ut de integro totæ rudes innoxiæque generantur. ‡ ---Incipiet ergo putreſcere, dehinc laxata ire in Humorem, & aſſidua Tabe defluere.--- *Seneca. Nat. Quæſt. L. 3. c. 27, 29.*

Particles of it, being looſened, to turn into a Fluid, and by a continued Solution to be abſolutely liquated. To which Opinion of this Philoſopher *Lycophron* very much agrees,

> * *When* Jove, *in Tempeſts raging, ſtorm'd the Earth,*
> *He daſh'd the Whole into minuteſt Atoms.*-----

Where the Scholiaſt, *Iſ. Tzetzes*, expounds ἠμάθυνε by ἄμμον ἐποίησε καὶ ἔκλυσε: and that very properly, ſince all *Stone* was reduced into *Sand*, and the *hardeſt* Bodies in the Earth into *ſoft* and *tender*. So that, at the Deluge, in ſuch State of Things,

† *The World was unmade or taken to Peices again*, as ‡ *Nonnus* in his *Dionyſiaca* well obſerves. We have alſo ſome Footſteps of the Earth

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* Ὅτ' ἠμάθυνε πᾶσαν ὀμβρήσας χθόνα,
Ζηνὸς καχλάζων νασμὸς. ——

† ——— Κόσμος ἄκοσμος ἐγένετο. ———

‡ Lib. 6.

being ſo diſſolv'd, and melted as it were, in *Manilius* §.

Th' Earth quivers now, before tho' firmly bound,
And from their Feet withdraws the treacherous Ground.
The melted Globe ſwims in itſelf: the Main
Spews up a Sea, and ſucks it in again.
Nor can the great Abyſs itſelf contain.
All Nature thus was in Confuſion hurl'd,
And the Deep *gorg'd itſelf with all the World.*
Deucalion *only then remain'd behind,*
The Solitary Heir of all Mankind.

The Knowledge and Tradition that the Gentiles had of theſe Things came firſt from the *Eaſt*. The *Hebrews* of old had frequent Commerce with

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§ Concutitur Tellus validis Compagibus hærens,
Subducitque ſolum Pedibus; natat Orbis in ipſo;
Et vomit Oceanus Pontum, ſitienſque reſorbet,
Nec ſeſe ipſe capit. Sic quondam merſerat Urbes,
Humani Generis quum ſolus conſtitit Hæres
Deucalion.—— *Manil. Aſtr.* Lib. 4.——

the *Phænicians*, and *Ægyptians*, and both theſe with the *Græcians*. And thence was the Fountain and Origin of many of thoſe Notions, and Cuſtoms, which afterwards obtained among the *Greeks* and *Romans*. That the Deſtruction of the whole Earth was threatened, before the Deluge: and that that Deſtruction was effected during the Deluge, we have the Authority of *Moſes*, *Gen.* vi. Vulg. Lat. † *I will deſtroy them, with the Earth.* So the § LXX Verſion, *And behold, I will deſtroy them, and the Earth.* *Gen.* ix. ‡ 11. *Nor ſhall there hereafter be a Deluge to deſtroy the Earth.* So the *Hebrew*, as well as the *Samaritan*, *Chaldee*, and other Interpreters. The * Vulgar *Latin* Tranſlator hath it, *Nor ſhall there hereafter be a Flood diſſolving the* Whole Earth. The ‡ LXX, *and there ſhall be no more a Deluge to diſſolve the* Whole Earth. *Diſſipare*, the Word uſed here by the Vulgar Interpreter, ſignifies not only *disjicere* to ſcatter, but *liquare*, and *diſſolvere*, *to melt*, and *diſſolve.* Thus *Seneca*, † *the Showers waſh away the Snow in the Spring; and the firſt Heat melts* [diſſipat] *what remains behind.* And *Cicero*, § *Epicurus is againſt the Notion of Bodies Concreting, leaſt it ſhou'd be inferr'd* that, on the Contrary, there might be a *Periſhing* and *Diſſolution* [Diſſipatio] of them. To which the Word Καταφθεῖραι, uſed by the LXX, well anſwers, ſignifying to *melt*, *corrupt*, *putrefy*; from Φθέω, or rather from φθεὶρ, whence alſo Φθειρίασις. So that that

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† Ego diſperdam eos cum Terra. Vulg. *Lat*. *Gen*. the 6th. 13.

§ Καὶ ἰδοὺ ἐγὼ καταφθείρω αὐτοὺς, ϗ τὴν γῆν. LXX.

‡ Neque erit deinceps Diluvium ad diſperdendum Terram.

* Neque erit deinceps Diluvium diſſipans omnem Terram. Vulg. *Lat*. *Rob*. *Steph*. f. Par. 1546.

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‡ Καὶ οὐκ ἔτι ἔσται κατακλυσμὸς ὕδατος καταφθεῖραι ΠΑΣΑΝ τὴν γῆν.

† Quippe vernis Temporibus Imbres nivem diluunt: Reliquias ejus primus Calor diſſipat. *Nat. Quæſt.* Lib. 4. C. 2.

§ Epicurus Corporum Concretionem fugit, ne Interitus & Diſſipatio conſequatur. *De Nat. Deor.* Lib. 1.

Deſtruction of the Earth was effected by *melting* and diſſolving *it*, and *all Foſſils.* To this the Royal Pſalmiſt [*] agrees, *He uttered his Voice, the Earth melted.* For which Reaſon *Philo-Judæus thought the whole World, at the Deluge, was turned into the Nature of Water.* [‡] So the *Pſeudo-Sibyll,*

Water is all, and all Things are deſtroy'd by Water. [§] And the Author of the Book *De Dea Syria,* [*] *All Things are become Water.* Among the ſacred Writers alſo there's great Agreement, as in other Matters, ſo likewiſe in this. *Habak.* iii. 6. [†] *He ſtood and meaſured the Earth; he beheld, and drove aſunder the Nations; and the everlaſting Mountains were broken to Pieces,* [or ſcattered, *diſſipati*, *Hebr.*] *the perpetual Hills did bow.* So the LXX, [⸸] *The everlaſting Mountains were diſſolved, the eternal Hills were melted.* The Chald. Paraphr, [§] *He diſcover'd himſelf and ſhook the Earth, and brought on the Flood,* &c. *The Mountains that were from all Antiquity are broken to Pieces, the Hills that were from the Begining are depreſs'd* or beaten *down.* The *Syr.* Verſion, [†] *The Mountains are diſſolved, and the Hills are brought low.* The *Arabic*, [*] *The Mountains are diſſolved, the Hills are melted.* And lower, Verſe x. [‡] *The Mountains trembled: the Overflowing of the Waters*

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[*] Dedit in Voce ſua; liquefacta eſt Terra. *Pſalm* xlvi. 6.

[‡] Νομίσαι τὰ μέρη τοῦ παντὸς εἰς μίαν φύσιν τοῦ ὕδατος ἀναστοιχειούμενα. De Abrahamo. p. 355.

[§] Ὕδωρ ἔσται ἅπαντα, καὶ ὕδασι πάντ᾽ ἀπολεῖται.

[*] Πάντα ὕδωρ ἐγένοντο.

[†] Stetit & menſus eſt Terram: Vidit & exſilire fecit Gentes: & contriti ſunt Montes Perpetuitatis, incurvaverunt ſe Colles Sæculi. *Habak.* 3. 6.

[⸸] *Διαθρύϐη τά ὄρη ϐία, ἐτάκησαν ϐȣνοὶ αἰώνιοι.* LXX.

[§] Revelatus eſt & commovit Terram, & adduxit Diluvium, *&c.* Fracti ſunt Montes qui erant ab antiquo, depreſſi Colles qui extiterant a Sæculo. *Chald.* Paraphr.

[†] Diſſipati ſunt Montes, & humilati Colles. *Syr.* Verſ.

[*] Comminuti ſunt Montes: —liquati ſunt Colles. *Arab.*

[‡] Tremuerunt Montes: Inundatio Aquarum tranſiit: dedit Abyſſus Sonitum ſuum. Verſ. x.

ters paſſed by: the Abyſs uttered his Voice. In this Place *the Deſtruction of the Mountains* is particularly treated of: and hence it is plain the primitive Mountains were [*contriti*] *beaten to Pieces*, or, as the Commentators rightly explain it, *liquati*, *comminuti*, *diſſipati*, *melted*, *broken to Pieces*, *diſſolved*. Nor is this any other than what I was lead, by Obſervations of Nature, to ſet forth, *Nat. Hiſt. Earth*, Part 2. Thus likewiſe *Amos* ix. 5. 6. *The Lord God of Hoſts is he that toucheth the Land*, [or the Earth,] *and it ſhall* MELT, *and all that dwell therein ſhall mourn.* IT *ſhall riſe up* WHOLEY *like a* FLOOD, *and ſhall be drowned as by the Flood of* Ægypt. The Vulg. *Lat.* ‡ *The Lord God of Hoſts is he who touches the Earth, and it ſhall* MELT, *and all who dwell therein ſhall mourn: and* ALL *the Earth ſhall riſe up like a River, and*

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‡ Dominus Deus Exercituum qui tangit Terram, & tabeſcet: & lugebunt Omnes habitantes in ea: & aſcendet ſicut Rivus omnis, & defluet ſicut *Fluvius Ægypti.*

and flow about like the Flood of Ægypt. This Paſſage does not treat of any new or future Deluge, as ſome imagine. For both the Prophet and the People were aſſured by an Oracle, * of all others the moſt infallible, that no ſuch ſhou'd ever happen more, to the End of the World. The dreadful Devaſtation made by that antient Deluge was in every Man's Mouth, and impreſs'd on every Mind. Nor was there any more eaſy and ſure Method to ſtrike the People with Horror and Diſmay than by mention of that Deluge, and Repetition of the ſurprizing Phænomena of it. For this Reaſon the *Jewiſh* Writers the oftener made Uſe of this Method. As did *Amos* alſo; and indeed *the diſſolution of the whole Earth* could not be more fully or happily expreſs'd by any Series of Words, than thoſe which this Prophet has made choice of, nor could the promiſcuous *Raiſing* of the Earth ſo diſſolved, and the *ſuſtaining* it in the *Water* be more clearly ſet forth; of which alſo, traceing cloſely the

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* *Gen.* ix. 8. & ſeq.

Footſteps of Nature, and ſupported by Obſervations made in the Bowels of the Earth, I treated *Nat. Hiſt. Earth.* Part 2d. Conſect. 2d. Of this likewiſe the Compiler of the *Sibylline* Oracles,

The Mountains and the Earth ſhall ſwim.--- ǂ

As above,

--------- He ſhall break up
The Earth's Receſſes, and diſſolve her Walls.--- †

Thus *Iſaiah* xxiv. 18, 19, *The Windows from on High are open, and the Foundations of the Earth do ſhake, the Earth is utterly broken down, the* EARTH *is clean* DISSOLVED, *the Earth is moved exceedingly.* The *Chaldee* has * it, *The Earth is diſſolved by a Diſſolution :* the LXX, *with Confuſion ſhall the Earth be confounded.* So *Job* xii. 15. § *God ſendeth out the Waters, and they*

ǂ Πλεύσει γή, ϖλεύσουσιν ὄρη. Orac. Sibyll. Gallæi. Lib. 1. p. 133.

† Κευθμῶνάς τε γαίης σκεδάσει, ϗ τείχεα λύσει. Ibid p. 122.

* Diſſolutione diſſolvetur Terra. Chald.

‡ LXX. Ταραχῆ ταραχήσεται ἡ γὴ.

§ Deus emittit Aquas, & ſubvertunt Terram. *Job.* 12. 15.

they overturn the Earth. The lxx, †* *He ſent forth the Waters, which, overturning (the Earth,) deſtroy'd it.* And this is that [Απώλεια] *Deſtruction* of the Earth of which St. *Peter* ſpeaks, § *By the Word of God the Heavens were of old, and the Earth ſtanding out of the Water, and in the Water. Whereby the World that then was, being overflowed with Water, periſhed. But the Heavens, and the Earth, which now are,* &c. In which Account indeed he gives a ſhort, but true Repreſentation of the Conſtitution of the Terraqueous Globe, or of the Orb of Earth, with the Abyſs ſhut up in it, and the Ocean without. How exactly agreeable to Nature itſelf this is drawn, may be ſeen in my *Nat. Hiſt. of the Earth,* Part 3d. The Apoſtle aſſerts that primitive Earth to have been *deſtroy'd*: as, after him, the Author of the Book *de*

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†* LXX. ὕδωρ —— ἐπαφῆ ἀπώλεσεν αὐτὴν (γῆν) καταστρέψας.

§ Ουρανὸι ἦσαν ἔκπαλαι καὶ γῆ, ἐξ ὕδατος καὶ δὶ ὕδατος συνεστῶσα τῷ τοῦ Θεοῦ λόγῳ. δὶ ὧν ὁ τότε κόσμος ὕδατι κατακλυσθεὶς ἀπώλετο. Οἱ δὲ νυῦ οὐρανὸι, καὶ ἡ γῆ, &c.

de Egregoris, [*] which is wrongly aſcribed to *Enoch*, *The* WHOLE *Earth is deſtroyed.* To conclude, he makes a plain and manifeſt Difference betwixt the Antediluvian Earth, and that which we now inhabit, betwixt *The World that then was, and the Heavens and the Earth which now are.* [‡] As *Philo* likewiſe fitly and wiſely obſerves, *a new Earth* [§] ſprang from the Primitive, which was diſſolved at the Deluge: and St. *Chryſoſtom* [†*] aſſerts, that there was an *Aboliſhing* or Deſtruction, as of Men and Animals, ſo *likewiſe* of *the Earth itſelf*, and that the ſame was afterwards [*§] *reſtored* and *framed anew.* Many of the Modern *Jews* likewiſe, as well as the Antient, maintain directly the ſame Doctrine. For tho' they did not know how far the Diſſolution went, yet they affirm that there realy was a Diſſolution. *The* Hebrews *ſay three Palms of the Surface of the Earth were diſſolved, and turned into Water; and therefore it is ſaid*, Gen. vi, 13, *And I will deſtroy them, with the Earth.* † To this is agreeable *the* Hebrews *calling the Deluge* מַבּול, *which according to* R. S. *is derived from* בָּלַל, *to confound; becauſe all earthly Things were confounded by it. But* Kimhi *derives it from the Root* נָבָל, * *which ſignifies to flow about, and rot to pieces.* The *Rabbins* alſo aſſert, ‡ *that all the Trees on the Earth were rooted up by the Waters of the Deluge.* The Trees therefore being thus deſerted, by the Earth's being diſſolved, and they being all fallen down, § many of the bigger Sorts of them, having large and ſpreading Heads, lay, upon the Departure of the Flood, with their Branches ſtretched up to a great Height

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[*] Ap. Grab. in Spicileg. Patrum. p. 351. ἡ γῆ απολλυται ΠΑΣΑ.

[‡] ὁ τὸτε κόσμος, —— οἱ δὲ νῦν ȣ̓ρανοὶ, καὶ ἡ γῆ.

[§] Νέας [τῆς γῆς] ἀναφανείσης. De Vita Moſis, Lib. 2. p 663.

[†*] Καὶ αὐτῆς τῆς γης τὸν ἀφανισμον. Homil. 22. in Gen. v. Op. Tom. 2. p. 262.

[*§] Ἀναϛοιχείωσιν. Ibid. p. 266.

The Condition and Site of the Trees, particularly of the Olive, after the Return of the Waters of the Deluge.

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† Lyran. in Gen. vi. 13.
* Munſter in Gen. vi. 17.
‡ Id. in Gen vii. 18. and viii.
§ *Nat. Hiſt. Earth*, Part. 6.

Height in the Water, and, after that was withdrawn, in the Air. And thus probably lay the Olive Tree, § from which the *Dove* pluck'd the Leaf, ſhe brought to *Noah*, Gen. viii. 11. But Dr. *Camerarius* earneſtly contends, † *that even the Olive Leaf alone, which the* Dove *returning brought to* Noah, *ſufficiently proves that the Earth remained intire, and the Tree continued fixed by its Roots to the Earth, under the Waters of the Deluge.* The Reaſon he gives is this, *for*, ſays he, * *if the Tree had been floating about, a Leaf of it had been no Proof, to* Noah, *that the Earth was become dry.* Nor truly did *Noah* infer any ſuch Thing from thence; he only conjectured that the Waters were ſo far ‡ *abated* and diminiſhed, that the Trees began to appear. And that he might with as much Reaſon have concluded from thence, if the Tree lay along upon the Ground, as if it had ſtood upright. † *For the Olive Tree is ſometimes very tall, and large,* (*as Dr.* Stapel *rightly obſerves,*) *with Boughs ſpreading forth to a great Extent.* And therefore thoſe Boughs, which happened to extend upwards, while the Tree lay along, might appear as far above the Water, as any others could if the Tree had been then ſtanding. So that the *Dove* might pluck a Leaf from one of theſe, as long before the Waters were abated, as it could, if the Tree had then ſtood upright, and rooted in the Ground. *Moſes* himſelf gives no expreſs Account of the Condition and Site of the Olive Tree. But if his * *Deſtruction* of the Earth implies its *Diſſolution*, which indeed I think I have proved, § it is certain that Tree cou'd not be ſtanding at that Time. As for *Noah*, it is evident, from the Hiſtory itſelf, that he knew nothing of what was done, at that Time, out of the Ark. If he knew not that the

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§ *Nat. Hiſt. Earth.* Ibid.

† Diſſert. Epiſt. p. 344.

* Ibid.

‡ Gen. viii. 8. 11.

The Moſaic *Account of this Affair conſider'd.*

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† J. Raij. Hiſtor. Plant. Vol. 2. p. 1541.
* Gen. vi. 13. ix. 11.
§ *Nat. Hiſt. Earth.* Part 2d.

the Waters were abated, 'till he ſent out a *Dove* to diſcover that, much leſs cou'd he know that the Earth was diſſolved, and all the Trees driven about as Chance directed. So that had *Noah* believed the Olive Tree to have been *ſtanding*, which yet does not appear, that had realy made Nothing to the preſent Purpoſe; nor could that Miſtake of his have been brought as an Argument againſt me.

The Olive Trees were rooted up about Mount Ararat *at the Deluge; for none are found growing in that Country now.*

I cannot leave this Argument without obſerving one Thing, which I think very material. Tho' we learn from *Olearius*, *Tavernier*, *Chardin*, and others, that Olive Trees are found growing in great Numbers in *Perſia*, and other Places far remote, yet *none now grow* in all that Country where the Ark reſted; * whence it happens, that *many have very much wondered, whence the* Dove *took the Leaf ſhe brought to* Noah. But that Difficulty will immediately vaniſh, and the Truth of the Thing appear without any Room for Doubt, if the Affair be rightly conſidered and repreſented. For probably theſe Trees might abound in that Country before the Deluge; and yet be all then rooted up, and buried deep in the Earth, or laid along upon its Surface. Nor ſhould any one wonder if the Olives of *Ararat* had the ſame Fate with our † *Engliſh* Pines, which we ſo commonly find buried in our Fenns and Marſhes, when yet none are found now growing here, unleſs planted, and raiſed by Art. And indeed, in this Caſe, 'tis plain, the Olive Tree, from which the *Dove* cropped the Leaf, could not be in a ſtanding Poſture, but lying along. And very likely 'twas owing more to Chance than Choice, that the *Dove* took an Olive Leaf; for any other had ſerved as well to ſhew the Waters were abated. But probably the Olives there lay in greateſt Numbers, and that Leaf offered itſelf firſt.

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* Il n'y a point d'Oliviers; ce qui fait, que pluſieurs s'étonnent ou la Colombe peut prendre la Rameau qu'elle apporte à Noë. Les Voyages & Obſerv. du Sieur de la Boulaye 4to. p. 85.

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† See Diſſert. 3. Sect. 3. Infra.

And if it imported but little what Leaf was brought, there was no Neceſſity, that the *Dove* ſhould take her Flight into *Perſia*, or ſome other remote Country, to find out this. Beſides a Leaf brought from any other Region had not ſhewed the Thing looked for. For the Earth was not plain, but ſome Parts of it lay higher than others: and therefore a Leaf brought from a very remote Country had indeed ſignifyed that the Waters, if any ſtill remain'd in thoſe Parts, were little, and of no conſiderable Depth; but not at all, in the Parts where the Ark reſted, and that Leaf was not gathered.

THE NATURAL HISTORY OF THE EARTH

Illuſtrated, and *Inlarged:* as alſo, *Defended*, particularly againſt the late OBJECTIONS of Dr. *Camerarius.*

PART II.

II. The 2d. Part of this Diſſertation, wherein are conſidered Dr. Camerarius's *Miſtakes, and careleſs Way of paſſing Judgment of theſe Things.*

II. THE Inſtances alledged in the former Part of this Diſcourſe, to which many more might be added, ſufficiently ſhew, with what Care the learned *Camerarius* had read my Writings, and what Regard he had to Truth, when he undertook to refute what I had therein ſet forth. Nothing more ſeems now to remain on my Part, but to ſhew, with all poſſible Brevity, in ſome few Examples, what the Extent of his Skill and Knowledge in theſe Things, is.

1. He joins and confounds Things that are in their Nature very different.

1. For when he offers, as he does, Natural Things confuſedly, and preſents in the ſame Order and Claſs ſuch as have not the leaſt Relation to one another, but are moſt different in their Nature, they who do not better know this Gentleman, might be apt to ſuſpect this to have been the Effect of his Ignorance in this Affair, or done with Deſign, and ſome indirect Purpoſe to keep others in the Dark, as to the Merits of the Controverſy begun by him. If any deſire Proofs hereof, ſuch may be found, as in many other Places, particularly in Page 298, and 299; where he promiſcuouſly brings in, together, Shells, Bodyes formed in Shells, Stones, and native Foſſils, none of which have any Agreement in Nature with the other, or are Things of the ſame Claſs.

He gives unfit Names to Things.

To this confuſed Way of rangeing Things, may be added, thoſe uncouth Names, he makes uſe of, deviſed, and impoſed by fancyful Men; ſuch as *Ombria*, *Brontia*, *Gryphites*, *Hyſterolithos*, *Bucardites*, *Balanoides*,

noides, and others; which Names communicate no real Ideas in themſelves, nor in the leaſt aſſiſt towards underſtanding the Conſtitution, or Properties of the Things to which they are applied. Tis certainly the Buſineſs of a Naturaliſt, by fit and deſcriptive Names, to clear up Things not well known; but by no Means to render them more obſcure, by a Cloud of Names, which neither any Way explain the Nature of the Things in Queſtion, or any others, nor indeed convey any right Notion of them to the Reader:

Not with dark Smoak to ſmother
up what's bright,
But out of Smoak to ſend clear
Rays of Light *.

2. *Dr.* Camerarius's *Inconſiſtency as to the Shells keeping themſelves whole, whilemoved and toſſed by the Waves, amongſt Stones.*

2. But to ſpend no more Time about his Way of methodizing, and of naming Things, let us come to the Things themſelves. Dr. *Camerarius* asks † *with what Colour can it be ſuppoſed, that Shells, ſinking down together, and forming the ſame Stratum by Reaſon of their being of the ſame*

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* Non Fumum ex Fulgore, ſed ex Fumo dare Lucem. Horat.

† *P.* 309, 310. *Conf.* 296, 297.

ſame ſpecifick Gravity, ſhould not be then broke to pieces; for that muſt of Neceſſity have happened from their being daſhed each againſt other, as they ſubſided, in the confuſed Commotions of the Waves. The Stones, meerly by their Weight, muſt have broke the Shells which were there amongſt them, and beat them all to Bitts. He thinks it utterly impoſſible for them not to have been ſo broke: and therefore makes this Objection more than once. But it ſurely is a ſufficient Anſwer to this ſo often repeated Objection, that ſo vaſt a Number of Shells are ſtill found entire, and not at all broken, even in the firmeſt and hardeſt Stone. Nor does he himſelf deny that this is actually ſo. *Shall I aſſert,* ſays he, *that no real Marine Bodyes are found there?* * *Far be it from me after ſo many Obſervations of that learned Gentleman,* and, he might truly have added, of every other Man, *in all Parts of the Earth.* He preſently after this makes Anſwer to a Queſtion of his own, *By what Means came theſe Shells into the Earth, the Strata, and thoſe Parts*[*]*? Many of them*, ſays he, *if not all, were caſt there by the Deluge, through the Fiſſures of the Earth, while it was gaping, and lodged in the Strata while they were yet ſoft and fluid.* Now what Part am I to act here, when he is at ſuch Variance with Himſelf, ſhould I interpoſe as a Reconciler? He grants that the Shells are realy found in the Strata: and points out the very Means of their Conveyance thither; *viz.* they were lodged there by the *Deluge*, while the Strata were yet *ſoft* and *fluid.* And yet he averrs he is entirely ignorant, with what Appearance of Truth it can be ſuppoſed *that the Shells ſinking together, and forming the ſame Stratum, ſhould not be then broke to Pieces*, and deſtroyed, *by the Daſhing and Agitation of the Stones.* Let us therefore proceed to ſomething elſe.

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* Page 346.

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[*] Page 346.

3. *Of the* Gloſſopetræ, *their Nature, and Origin.*

3. What they commonly call the *Gloſſopetræ*, of which I my ſelf have ſeveral digged up here in *England*, as well as others brought from the Iſland of *Malta*, and various other Countryes, are apparently Teeth of Sharks, and ſuch like Fiſhes. Nor, indeed, according to any Judgment to be formed from the Words of Dr. *Camerarius* himſelf, can I make the leaſt Doubt, but that thoſe he mentions, digged up about *Montpelier*, are the Teeth of Marine Animals alſo, tho' he is at ſo great Uncertainty about them. For, what Reaſon does he produce for his Doubts about theſe †? Only becauſe in Diſtillation they did not yield *Volatile Salt*, *Spirit*, *and Oil*, in the Quantity he expected; tho' they did afford an *Urinous Phlegma*, which alone might have ſerved as a *clear Indication of a Volatile Animal Salt* ‡. But, tho' from theſe Tokens they did not with any Certainty appear to him to be the Teeth of Animals, yet, ſince even ſuch a *Phlegma* is not to be extracted from any Mine-

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† P. 272. ‡ P. 172.

ral Body, it is thence highly probable that theſe rather had their Origin from any Part of Nature than from the Earth. And indeed whoever makes Searches of this Kind, without obſerving the various Circumſtances of the Things, and comparing them well together, will obtain little Light or Advantage from them. There is no one but knows how eaſily and how ſoon the Volatile Particles, of almoſt every Body, fly off of their own Accord, and are exhaled. Nor certainly can any one expect ſo great a Plenty, of theſe, from thoſe Teeth which have lain buryed above 4000 Years in the Earth, as from others of the ſame Kinds juſt taken freſh out of the Mouths of the Animals. If Dr. *Camerarius* ſhould doubt of this, let him try, if he can, to extract a like Quantity of Salts from human Bones and Skulls which have been long buryed, as from thoſe of Bodyes but newly dead.

The Opinion of Fabius Columna, *con-*

But to that Argument Dr. *Camerarius* adds another, which is, that * *the Gloſſopetræ do not (as* Fabius Columna

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* Page 273.

cerning theſe Bodyes, aſſerted, and his Reputation vindicated.

lumna *had*, he ſays, *falſely pretended) turn into a Cinder, but into a Calx.* For thoſe *Gloſſopetræ* which *F. Columna* had procured from *Malta, did*, he tells us [*], *when put into the Fire, burn to a Cinder,* [Carbo] *before they went into a Calx, or Aſhes*, as the Bones, Teeth, Horns, and other like Subſtances of Animals, are wont to do: and for that Reaſon he judged them to be of the ſame Subſtance, and not of the Nature of Stones, which do not turn firſt into a *Cinder*, but into a *Calx*. Dr. *Camerarius* charges *F. Columna* [†] *with Falſehood for aſſerting that the Gloſſopetræ turn into a Cinder.* But how came he to any certain Knowledge of that? Did he learn it from Tryals made on the *Gloſſopetræ* of *Montpelier*, and finding that they immediately turned into a Calx? If he take upon him to affirm this, I will give him Credit. Yet there are ſome other Things which he ought alſo to have been well aſſured of, and carefully to have conſidered, before he had called in Queſtion, not the Judgment, but the Fidelity, of *F. Columna.* Not to mention others, he ought certainly to have known, if the *Gloſſopetræ* are found lodged in very different Places, and in different Sorts of Matter, whether they would not, in Tract of Time, be ſo affected by that Diverſity of Places, and of Matter, as to turn, when committed to the Fire, ſome of them into a *Cinder*, and others preſently into a *Calx*. He ought further to have obſerved, that the ſame Body, put into the ſame Fire, burning ſlower, or remaining there a ſhorter Time, will turn into a *Cinder*: but, if in a ſtronger Fire, or continued longer, into a *Calx*. Which is obvious of it ſelf: and indeed *Columna* has given ſome Hints of it. But to ſay ſomething here of the Character of *F. Columna*, he was a Perſon of a noble Family, and Himſelf a Man of extraordinary Ingenuity. He was alſo eminent for his great Learning: and for his Purſuit of the Study of Natural Things with more Diligence, Accuracy, and Succeſs,

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[*] F. Col. *De Gloſſop. Diſſert. ſub fin. Lib. de Purpura.* p. 31. [†] Fab. Col. ibid.

ceſs, than almoſt any one of thoſe Times; as the Writings he has left behind him, by which he has deſerved greatly of Poſterity, abundantly teſtify. His Contemporaryes looked upon him as a very diligent Searcher after Truth, and as a Man of the greateſt Fidelity; which Reputation he ſtill retains, now at the Diſtance of almoſt a Century from the Time of his Death. When the celebrated Dr. *Camerarius* therefore reproaches a Perſon of that illuſtrious Character, with Falſehood, as to an Experiment that he made, and yet realy produces no Proof of ſuch a Charge, he ſurely acts in a Manner unbecoming an ingenuous and learned Man, and ſuch as can be very little agreeable to thoſe who are realy ſuch. Nor has he treated this Gentleman only, who is of thoſe early Times, with ſo much Liberty, in his *Diſſertations*, but ſeveral more modern Writers likewiſe, and ſome who are yet living, and of the greateſt Repute for Learning and Judgment: and that, at leaſt as appears to me, and perhaps to all others of candid Diſpoſition, not becauſe what they have ſet forth is any Ways repugnant to Truth, but meerly becauſe their Opinions do not ſquare with his own.

4. Of the Diſſolution of the Earth, at the Time of the Deluge.

4. What I have written concerning the Diſſolution of the Earth, and of all Foſſils, the learned *Camerarius* is very averſe to admit. *Tho' it be allowed*, ſays he, *that real Marine Bodyes are found in the Bowels of the Earth,----yet it does not follow from thence, that the Earth was diſſolved at the Deluge* *. *Such a Diſſolution* he pronounces † *ſuppoſed, without any Proof:* and treats it as *ſupported by no Shew of Truth.* But before he had inveighed, with ſo much Vehemence, againſt this Propoſition, he ought to have ſhewn, how, without ſuch a Diſſolution, the Shells of *Conchæ*, *Cochleæ*, *Echini*, and other Marine Animals, came to be exactly filled with Stone, Flint, Spar, and other Mineral and Metallic Matter, as they are at this Day found to be: how the Surfaces of Stones, Flints, Spars, and other Mineral and Metallic Bodyes, every where digged

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* P. 287. † P. 326.

up, came to have the very Forms, and even the fineſt Lineaments of theſe Shells, impreſſed upon them: and, finally, how it happened that ſo great a Plenty, and Variety, of Marine Bodyes, were immerſed in the Strata of Stone, and almoſt every other Kind of Terreſtrial Matter, and ſo intimately and thorowly incorporated with that Stone, and Matter, as, together, to conſtitute one common Maſs; and this in Places the moſt remote from any Sea, and to the greateſt Depths in the Earth that Men ever dig; he ought, I ſay, to have explained by what Means all theſe Things could be effected, without a Diſſolution of the Earth, and of Foſſils, before he had, upon his ſingle Opinion, and Authority, condemned what I had advanced, wherein is given an Account how all this was brought about, and by a Method the moſt plain, eaſy, ſimple, and ſuch as is exactly conformable to the Procedure of Nature it ſelf.

Terreſtrial, and Mineral, but not Animal, or Vegetable Bodyes, diſſolved at the Deluge.

Dr. *Camerarius* neither believes himſelf, nor thinks any Body elſe eaſily will, that ſofter Matter remained entire, while the moſt ſolid was diſſolved, at the Deluge. *For whoever*, ſays he, * *ſhall compare the moſt ſolid Marble, and hardeſt Stone, with the tender Shells of Fiſh, will not be eaſyly perſwaded that theſe could remain entire, and not be diſſolved by that Agent that reduced all Marble into Powder.* But this perhaps will appear leſs wonderfull to any one who has obſerved, which may be eaſyly done in many Places, or been informed from the Obſervations of others, that the exterior Parts of Marble, and of the hardeſt Stone, lying a long while expoſed to the Weather, or the ſharp and ſalt Vapours of the Sea, are, by Degrees, worn, eaten, and conſumed away, while the Shells, contained in them, not only continue to exiſt, but often remain a long Time after entire, or but little hurt by the ſame Weather, Salts, and Vapour. Which Fact had this Gentleman, ſo very knowing in all other Reſpects, been rightly appriz'd of, and duely conſidered it, I'm apt to think he would not have inſiſted on this Argument. But, as to the true Cauſe of the Diſſolution, made at the Deluge, it cannot be ſufficiently ſhewn within the Compaſs of either that *Eſſay*, or of ſuch a Tract as this. My Deſign in both is to ſhew, that the Earth it ſelf, and all Foſſils whatever were realy diſſolved; but that Shells, and other Animal, and Vegetable Bodyes were not; and indeed that the Thing actually was ſo, I think I have, from Obſervations, ſufficiently made out, and proved. But to add ſomewhat further to what I have, above, brought in Anſwer to this Objection of the learned *Camerarius*, he ought alſo to conſider that the Texture, and Conſtitution of the former of thoſe Bodyes, is very different from that of the latter. For the Parts of Animals, and of Vegetables, are fibrous, and their Fibres connected, complicated, and variouſly interwoven each with other; but the Parts of Foſſils, even the hardeſt, are only contiguous, and held together by no common Tye. Whoever rightly reflects upon this Difference of theſe Bodyes, he will not think it ſo difficult perhaps to find the Reaſon why all the Foſſils were immediately diſſolved, while the others were not in the leaſt hurt, but remained entire and in their Original Condition. If therefore the celebrated *Camerarius* ſhould, at any Time, reſume this Argument, which, in real Friendſhip, I would adviſe him not to do, let him dream no more *of a Menſtruum ſufficient to diſſolve the whole Globe of Earth.* There are others indeed who, like him, have before done the ſame, without being able to touch any Point of what I have delivered; but only betrayed their own Ignorance, both of the Powers of Nature, and the Operations of a *Menſtruum.* He objects alſo to my Doctrine, that *the Diſſolution of the Globe would have been the Deſtruction of the firſt Creation* *. This I readily grant him, it being no other than what Nature ſhews, and *Moſes* teaches: and what indeed I my ſelf have endeavoured to make out, *viz.* that the Deluge was brought on, and the Diſſolution of the Globe effected, by the Divine Appointment, in Order to *deſtroy the firſt Creation. Nat. Hiſt. of the Earth.* Part II. 'Twas therefore his proper Buſineſs to have examined, and try'd to have refuted what I had there ſet forth, and not thus to have taken and dreſſed it up in Form of an Objection againſt what I had deliver'd.

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* P. 307.

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* P. 344.

5. Of the Abyſs, or that great ſubterraneous Reſervatory of Water.

5. The learned *Camerarius confeſſes* † *that he very much deſires to ſee Arguments to prove the Abyſs, or Central Sphere of Water.* But I think it needleſs to produce any new *Arguments* here, nor thoſe in particular with which, if God gives me Life and Leiſure, I am ready to render the Truth of this Matter more evident; ſince what I have propoſed in my Book has made it ſufficiently clear, and indeed put it out of Doubt. Nor can I make any Queſtion but thoſe Arguments would have given Satisfaction to this learned Writer,

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† P. 318.

had he ſufficiently attended to them. Which ſince he ſeems not to have done, I will here propoſe two of them anew; one of which is to ſhew the Quantity of Water that overflowed the Earth at the Time of the Deluge, and the other to ſhew the Place where the Water is now reſerved.

Of the Quantity of this Water.

Of the firſt of theſe we may form a Judgment from a Survey of the Strata, and generaly of whatever elſe is found in the Earth, being, as 'tis eaſy to obſerve in very many Places, all repoſited in a regular Order and Method, and indeed according to the reſpective Gravity of each. † For to effect this, 'tis moſt evident and certain that an immenſe Quantity of Water muſt needs be required. Such a Diſpoſition of Things, as we now almoſt every where ſee, could, by no Means, have been brought about unleſs the Fluid, in which all was tranſacted, had been very thin: unleſs the diſſolved terreſtrial Particles had been conſiderably diſtant each from other: and laſtly, unleſs their Deſcent was very great, or the Place,

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† See page 41, Et Seqq. ſupra.

from which they firſt began to ſubſide, very remote from that where they all at length ſettled in their Order. * For Nothing of that Regularity in the Settlement of the terreſtrial Matter could have happened, if thoſe Waters had not vaſtly exceeded that Matter in Quantity. But, if we ſuppoſe this, the Explication of this Phænomenon will be eaſy. For, as the Velocity of Bodyes ſubſiding in Water is different, according to the different Gravity of thoſe Bodyes, it was neceſſary that, of thoſe which were of the ſame Magnitude and Figure, and began to ſubſide together, and from the ſame Height, the heavyer ſhould ſink faſteſt, and ſo be placed at the Bottom of all. Yet, tho' thoſe Bodyes differed ſo much from each other in Gravity, it could not otherwiſe happen but that the Heavyer, in their Deſcent, ſometimes falling and hitting upon the lighter, ſhould be, by that Means, much impeded, and retarded in their Motion; while the Lighter were

Of the Momenta of heavy Bodyes deſcending in a Fluid.

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* For this was abſolutely neceſſary, that the heavyer Bodyes, from ſo great a Space of Deſcent, might have Time to get before the lighter, and leave them at ſome Diſtance behind. For, without that, they had not been placed deeper and below them.

were accelerated and puſhed on by ſuch Impulſes of the Heavyer.* But, after the Heavyer had reached their Journey's End, or the Bottom of the Water, the Lighter might proceed to ſubſide in their Order, unleſs, when it ſo happened, that, by ſo great a Quantity of terreſtrial Matter, ſubſideing between the Heavyer and the Lighter, as to fill the intermediate Space betwixt them, both ſettled at the ſame Time. In Caſe no ſuch Impediment intervened, two ſuch Bodyes would be repoſited at no great Diſtance beneath one another; † tho' if the Lighter of them was ſo impeded, it would be layd at a greater Diſtance above the Heavyer. But if there happened to be two Bodyes, not very different in Gravity, it was neceſſary that the Heavyer of thoſe ſhould ſink thro' a great Space of Fluid, before it could leave the other, which was

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* From theſe their Colliſions it was unavoidable but there ſhould be ſome Confuſion and Diſorder in the Sediment they together conſtituted.

† So that, Heavyer and Lighter Bodyes may ſome Times be found near one another, and lodged in the very ſame Stratum, tho' their Subſidence was exactly according to the Laws of Gravity, and tho' thoſe Bodyes, ſo different in Gravity, ſunk through a very great Space of the Fluid.

but a little Lighter, at any conſiderable Diſtance behind it. And yet, of thoſe Bodyes, that are almoſt equal in Gravity, we frequently ſee the Heavyer lodged in the Strata far beneath the Lighter; whence 'tis moſt evident that theſe two Sorts of Bodyes muſt needs have ſunk through an immenſe Maſs of Fluid. If we conſider all theſe Things, with due Attention, 'twill thence abundantly appear that ſo great a Work could not have been tranſacted, without the whole Stores of the Abyſs, or ſuch an Orb of Waters as I repreſented. * Which of itſelf ſufficiently ſhews that ſuch an Abyſs realy exiſted.

Of the twofold Increaſe of the Waters aſſigned by Moſes. *Occaſionaly, of the* Moſaic *Origin of the Earth. Alſo of the* Chaos *of the Antients.*

After that the *Deluge* had *prevailed* for the firſt *forty Days*, and *the Waters were increaſed greatly*, ſo that *all the high Hills under the whole Heaven were covered; and the Waters were fifteen Cubits above the the Mountains*, † which Inundation was brought on, that Men, and all terreſtrial Animals, might periſh in it, the Waters *prevailed* anew, and, very likely, for a much greater Number of Days. *An hundred and fifty Days* [*] are mentioned in the Whole. In the firſt forty of theſe, the Waters were brought out of the Abyſs, which, together with the Rains that fell, covered the Mountains. But in the following Days the primitive Earth was diſſolved: the Waters which then remained in the Abyſs were poured out: the diſſolved Matter of the Earth was taken up into and ſuſtained in the Waters, and afterwards precipitated again downwards, diſpoſed, and formed into a new terreſtrial Globe. But, hitherto, the Condition of this new Globe, was the ſame of the old one when firſt created; [§] *it was without Form,* [‡] that is, not yet reduced to ſuch *Form* as might render it habitable, and fitted for ſuch Ends as it was made to anſwer. The Surface of it was *plain*, even, and *ſpherical*; *not broken*, ſo as to have any Hills, Valleys, Caverns, or Fiſſures; [†] all which were

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* *Nat. Hiſt. Earth.* Part 3. Sect. 1. Conſect 1.

† *Gen.* vii. 17, 19, 20.

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[*] *Gen.* vii. 24. [§] *Gen.* i. 1. [‡] *Gen.* i. 2.
[†] *Nat. Hiſt. Earth.* Part 2. Conſect. 5.

abſolutely neceſſary for the Production, and Suſtenance of Animals, Vegetables, and Minerals. It was alſo, like the primitive, *void*, * while all the Waters, that were to be ſuddenly ſent back into the Abyſs, which was then *void*, or empty, and to be remanded again into the Bowels of the Earth, remained yet, without, upon the Surface of it: and till this Sphere of Earth, which was like a Cruſt, or Shell, was broken, † Hills raiſed, Valleys ſunk, and Fiſſures made, whereby the Waters were to return down again into the Abyſs. Afterwards the Waters, withdrawing at the Divine Command, *were gathered together unto one Place*; ‡ *viz.* into the Abyſs, within the Earth, § and, which is as a Kind of Appendage to it, the *Sea*, ⸸ as before in the original Earth; *and the dry Land appeared.* [†] And the Earth at length attained a *Form* compleat, fitted for Habitation, and to anſwer the Uſes of it. Of this whole Affair I may ſome Time treat more at large; but, till then, what I have already wrote ſufficiently ſhews the Senſe of the ſacred Writer, where he ſayes, *the Earth was without Form, and void.* * From theſe Words of *Moſes* the Heathens deviſed their *Chaos*; and are herein followed by moſt Modern Philoſophers. But neither the *Jewiſh*, nor *Chriſtian* theological Writers, ſeem to have rightly underſtood this Paſſage; they being not throughly informed of the true Fabrick and Conſtitution of the terreſtrial Globe: nor did they ſufficiently attend to the *Moſaic* Deſcription of it, couched indeed in few, but the moſt proper and expreſs Words, that could ever poſſibly have been pitched upon. To conclude, in ſome Time of the latter Part of this Space of 150 Days, the Waters were abated, and withdrawn from off the Earth, ſo far, that their Surface was ſunk to about the ſame Degree, to which it had aroſe in the firſt forty Days of the Flood, and the Ark touched upon

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* *Gen.* i. 2. † *Nat. Hiſt. Earth.* Part 2. Confect 6. 8. ‡ *Gen.* i. 9. § *Nat. Hiſt. Earth.* Part 2 and 3. ⸸ *Gen.* i. 10. [†] *Gen.* i. 9.

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* *Gen.* i. 2.

Mount *Ararat*; * where, at length, it reſted.

Of the Place where thoſe Waters are, at this Day, ſtored up. And ſomething further touching Earthquakes.

The other Argument, whereby I proved that ſuch a Maſs of Water did realy exiſt, and ſhewed the Place where it is now reſerved, is drawn from Conſideration of ſome Phænomena of Earthquakes. For that theſe are cauſed by the Force of Waters within the Earth I think I have proved by Arguments ſufficiently firm and convincing. Now ſince there are, on Record, Earthquakes, and indeed not a few, by which the Globe, for many hundred Miles together, has been ſhaken, at the very ſame Moment of Time, it thence follows, that the Waters, which cauſed thoſe Concuſſions, were not only equal in Extent to that Space of the Globe which was ſo ſhook, but one fluid Body continued, and not divided into Parts, or diſtinguiſhed into Regions, ſo that particular Portions thereof ſhould be confined each to its proper Cavern. *Nay, there want not*

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* *Gen.* viii. 4.

not Inſtances of ſuch an univerſal Concuſſion of the whole Globe, as muſt needs imply an Agitation of the whole Abyſs. † For an Effect of ſo vaſt an Extent could never have proceeded but from a Cauſe equaly extenſive; ſuch as might affect the whole Earth at once; which cannot be done without ſuch an Orb of Water, as I have deſcribed. We have had Accounts from Writers of the moſt unqueſtioned Fidelity, and even from Eye-Witneſſes, that there have been Earthquakes, in our own Times, ſo that it can hardly be thought that the learned *Camerarius* could be ignorant of them, wherein the Motion, given to the Earth at the ſeveral Shocks, perfectly reſembled that of the Waves of the Sea raiſed by a ſtrong Wind. Whoever ſhall rightly attend to this Phænomenon in particular, he muſt, not only acknowledge that the Earth contains in it an Abyſs of Water, and is moved by the ſame: but muſt alſo readyly agree with me that this terreſtrial Part of the Globe is Nothing but a thin Shell, which includes in it, cloſely on every Side, an immenſe Maſs of Waters, and whenever thoſe Waters happen to be put into any extraordinary Motion, the Earth is by them moved and agitated juſt in the ſame Manner as the incloſed Waters are moved and agitated. As of the primitive Earth, in which no One can doubt but that there was an Abyſs, ſo the Uſe and Deſign of this ſecond Earth likewiſe was to ſerve for an Habitation to Men, to ſend forth Vegetables, and all thoſe other Things, which might ſerve for the Nouriſhment, for the Defenſe and Convenience of Men, and Animals created for their Uſe. To anſwer which Purpoſe there was no Need of a thicker Cruſt of Earth; one more thin, ſuch as the preſent is, would beſt anſwer the End propoſed, the Water making up the far greateſt Part of the Globe. Nay, a thicker one would have perpetualy obſtructed the Paſſage of Vapours, † and intercepted all that Communication,

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† *Nat. Hiſt. Earth.* Part 3. Sect. 1. Conſect 12. in fine.

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† Confer. p. 109, 110, infra.

munication, betwixt the Abyſs and the Atmoſphere, which is ſo neceſſary for the Preſervation of human Life, and of all Things which grow out of the Earth. *

The exact Agreement that there is, betwixt Nature, and Holy-Writ, concerning the Abyſs, and the Structure of the terraqueous Globe.

To this Deſcription and Account of the terraqueous Globe, taken purely from Obſervation and Views of Nature, that of the illuſtrious *Arabian* Philoſophor *Job*, as well as that of *Moſes*, *David*, and others of the *Hebrew* Nation, is exactly conformable. Of which two Accounts

He who well knows either, will know both. †

Both of them ſet forth an Abyſs, a Maſs of Waters very vaſt; on which this our Globe, or Cruſt of Earth, is founded, expanded, and lyes built all round it. ‡ Both alſo ſhew that this Abyſs communicates with the Ocean, ſupplyes, and gives Riſe as well to Vapours, Rains, Springs, and Rivers, as to the various Phænomena, and Affections, of the terreſtrial Globe, and of our Atmoſphere. § Thus likewiſe we find, both from Nature, and from Holy Writ, that this immenſe Abyſs of Water, at the Time of the Deluge, was brought from out its Place, and poured forth upon the Surface of the Earth: and that afterwards the terreſtrial Cruſt itſelf, being firſt liquated and diſſolved, was taken up into and ſuſtained in that mighty Maſs of Water: and that finaly all that Matter, ſo diſſolved, afterwards ſubſiding, was compoſed and formed anew into a terreſtrial Globe, after the Model of that which was made in the *Begining*, at the Creation, and built and fixed upon a *Void*, a Place capable of ſuch an Abyſs, and fited finaly to receive it: and that this terreſtrial Sphere being at length burſt, and broken up, the Waters returning back again down into that hitherto *void* Place, left the Surface *dry Land*, commodious, fit, and rightly diſpoſed for the ſending forth of all natural Productions: ‡ and that all theſe Things were not brought about mechanicaly, by any Tendency of their own, or the meer Powers of Nature, but were now tranſacted, the whole Fabrick formed, and finiſhed anew, by the ſame Hand, and Divine Counſel, by which 'twas created in the *Begining*. * But I hope to have hereafter Occaſion to treat of theſe, and ſome other like Things, more at large.

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* Confer. p. 109, 110. infra.

† Qui utramvis recte norit, ambas noverit. *Terent.*

‡ *Nat. Hiſt. Earth.* Part 2, 3.

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§ Ibid. Part 3, 4. Conf. p. 109, 110. infra.

The Riſe of Meteors, and of allmoſt all the Changes, Phœnomena, and Affections of the Atmoſphere, from the great Abyſs.

Nor was this ſo mighty a Maſs of Water created, and laid up there meerely for the Sake of ſwelling out the Globe, and bringing it to its juſt and neceſſary Dimenſions; no, there are other Uſes of this huge ſubterraneous Work-houſe of Nature, that are not only exceeding proper, but abſolutely neceſſary for the Production and Conſervation of all natural Things whatever. For in this Abyſs of Water are ſeated the Origins, and Initia, or firſt Beginings of all that is afterwards tranſacted, and brought to Perfection, in the Earth itſelf among Mines and Minerals, as alſo on the Surface, of it, and in this Region of the Atmoſphere in which Vegetables grow, and whereon Man, and Animals live and have Being. That the ſame Seaſons, in different Years, are ſo various, in ſome more cold, or wet, leſs fertile, or healthfull: in other Years, quite contrary, more hot, dry, fruitfull, or more healthy; all theſe Variations, I ſay, are owing to the Operations of Nature, in that great ſubterraneous Promptuary of Water. As to Earthquakes, Vulcanos, Damps in Mines, the Origin of Springs, Rivers, and Rains, of Thunder, and Lightning, I ſay, I have offered my Sentiments, with the Obſervations whereon they are grounded, elſewhere; † intending, as I ſhall ſee Men's Minds ſettled, and turning to theſe Studyes, if God ſhall give me Leiſure, to methodiſe what I have wrote, and to treat of the ſame Subjects more at large, together with ſome others of like Sort, *e. gr*. Meteors, Froſt, Winds, Tempeſts, and Storms. Mean Time I ſhall only intimate here, in general, that from numerous Obſervations made by Perſons of great Senſe, and Fidelity, in every Part of the World, I am ſatisfyed that all theſe take their *Riſe* from the *Abyſs:* and that, whenever they are diſpoſed to iſſue out thence, they conſtantly ſend forth before them ſome ſure *Signs* of their Approach, very plain and diſcernible to all who attend and obſerve them, in the Sea, in great Lakes, in Springs, in deep Wells, in the Bowells of the Earth, in Caverns, and in Mines, before ever they begin to act, or ſhew themſelves on the Surface of the Earth, and in the Atmoſphere.

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‡ *Nat. Hiſt. Earth.* Part 2, 3.
* Ibid.

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† *Nat. Hiſt. Earth.* Part 3, 4.

The Cauſe of the Phœnomena of the Barometer.

I ſhall now make only this one ſingle Remark further, when Exhalations, Vapours, and watry Particles, aſcend in any extraordinary Quantity, from out the Abyſs, into the Atmoſphere, till they are there collected and ſo condenſed as to form Drops and Rain, theſe Exhalations thus taking a Courſe and Motion, and exerting a Force, in a Direction quite contrary to that of the gravitating Atmoſphere, they thereby ſo much diminiſh and break the Force and Preſſure of the Atmoſphere as ſenſibly to leſſen and render it more languid; which is the true Cauſe of the Deſcent of the Quick-ſilver in the Barometer, as often as thoſe Circumſtances happen. Nor, ſince 'tis now agreed on all Hands, that the Aſcent and ſuſtaining of the Mercury in the Barometer, is owing to the Preſſure of the gravitating Atmoſphere, can it be wondered that, when the Preſſure is, by the Cauſes here recounted, ſo much leſſened, that the Mercury ſhould thereupon deſcend. This is the real and conſtant Reaſon of that Phænomenon, as I have ſhewn in ſome Letters which I wrote ſeveral Years ago, and which perhaps may ſome Time appear in Publick.

Inſtances of certain Parts of the Earth's Surface being undermined by Earthquakes, and falling down into the Abyſs beneath.

What this learned Gentleman urges, p. 318, *that the Abyſs would afford but a weak Support to the terreſtrial Strata*, makes Nothing againſt me; I readyly allow the ſame Thing. For altho' the Earth, being a Sphere or Speroide, and conſequently every Segment of it an Arch, which of all Kinds of Structure is the ſtrongeſt, yet, ſince it is but thin, and ſubjected to the Force of ſuch an Agent as is within itſelf, it may happen to give Way to that Force. Which is no more than I have delivered in very plain Words.---*The Earthquake is ſometimes ſo extremely violent, that it plainly forces the ſuperincumbent Strata: breaks them all throughout, and thereby perfectly undermines and ruins the Foundations of them. So that, theſe failing, the whole Tract, as ſoon as ever the Shock is over, ſinks down to Rights into the Abyſs underneath, and is ſwallowed up by it; the Water thereof immediatly riſing up, and forming a Lake in the Place where the ſaid Tract before was.* †

6. Of the Salts that ſupply the Mineral Waters.

6. To what Purpoſe the learned *Camerarius* wrote that which I am next going to take Notice of, I cannot ſee, nor indeed avoid being much ſurprized at it; ſince it realy makes Nothing againſt what I have offered, neither is it indeed agreeable to Truth.

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† *Nat. Hiſt. Earth.* Part 3. Sect. 1. Conſect. 12.

His Words are theſe, *If the Water of the Abyſs had pervaded the Strata continualy from the Time of the Deluge, it muſt long ago have exhauſted and drawn all the Salts out of them. Nor had there any now remained, to have given that Taſt which we find in Mineral Waters.*[*] But have I ever propoſed any Thing that could be refuted by this Argument, ſuppoſing it was true in itſelf? I have advanced Nothing any where relating to the Quantity of Salt which the Water, paſſing through the Strata, brings thence along with it, nor to the Time wherein that Salt ſhall be totaly exhauſted. And therefore this is a Subject that I leave to be treated of by any who ſhall hereafter write of theſe Things. Yet I cannot but take this Opportunity to obſerve one Thing, which is, that that Water, whether it riſes from the Abyſs, or, if Dr. *Camerarius* will have it ſo, from any other Place, has actualy pervaded the Strata ever ſince the Deluge, and brought thence forth along with it Salts, and ſtill continues to bring them, without having yet, or being perhaps ever likely to drain them all forth. For they ſo eaſyly liquate, mix with the Water, and flow out along with it, and ſo great Abundance is there of them in the Strata, that there is no Reaſon to fear that theſe Salts, ſome of which are of the greateſt Uſe to human Life, and the Conveniences of it, ſhould ever wholey fail. Whoever ſhall obſerve how great Quantity, eſpecialy of Vitriolick or acid Sals, there's almoſt every where found in the Earth, will not have the leaſt Occaſion to apprehend there ſhould not be a ſufficient Supply of thoſe Salts, to ſaturate the Mineral Springs with all, thorow all future Ages.

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[*] Diſſertat. p. 328.

7. Mountains not raiſed by Force of Earthquakes.

7. When Dr. *Camerarius* ſays, *It is evident from Hiſtory, that ſo many high Mountains have been formed, and caſt up by Earthquakes,* * he ſpeaks of what I confeſs myſelf intirely ignorant, having never yet ſeen thoſe *Hiſtoryes*; ſo that I ſhould

eſteem

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* p. 303.

eſteem it as a very great Favour, if he could help me to the Sight of ſome of them. Certainly, when I had openly aſſerted, *that there is not any authentic Inſtance, in all Hiſtory, of ſo much as one ſingle Mountain that was heaved up by an Earthquake,* * he ought not to have aſſerted the Contrary without producing at leaſt *one Example* in Favour and Support of it. Till therefore he ſhews he can do that, while he is turning over his Authors, and producing their Teſtimonyes, I may be allowed to give my Judgment from Nature itſelf, and the State of Things in the Earth. It is needleſs to ſay any Thing here of the *Monte di Cinere*, in the Kingdom of *Naples*, the Matter of which I have ſhewed was not raiſed by an Earthquake, but thrown up by a Vulcano that then broke out there. † From the Times that Men firſt begun to write for the Service of Poſterity, there have not been wanting Perſons to committ to writing, whatever

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* *Nat. Hiſt. Earth.* Part 2. Sub fin.
† Ibid.

ever Works either of Art or Nature, they thought worthy the Notice of after Ages. Now, as they recorded many other Things, not alwayes becauſe they appeared to be of great Moment, but as they happened rarely, it is ſcarcely credible that they ſhould omitt thoſe more remarkable Events, which could not happen without even the Aſtoniſhment of all who ſaw them; ſuch as *the raiſing up ſo many vaſt Mountains* muſt certainly have been. The Riſe of that *Heap* of *Cinders* is taken Notice of by moſt of the Writers of that Time, and by ſome ſince; but not a Man, at leaſt that I know of, has ever committed to Memory the raiſing ſo much as any one ſingle Mountain. Till therefore the learned *Camerarius*, or ſome other, ſhall ſhew, from the Hiſtorians he talks of, not yet known to the learned World, that the *Alps*, the *Apennines*, Mount *Taurus*, *Atlas*, or others, or at leaſt ſome one Mountain, was formed and took its Riſe from an Earthquake, or any other like Force in Nature, I muſt ſtill, relying on the Arguments I have alledged in Defence of my own Opinion, believe thoſe, and the other Mountains, were formed all together, at the Time that I have elſewhere aſſigned. † For if, of the numberleſs Mountains that there are in moſt Countryes and Parts of the Globe, ſome of them very high, aud of great Extent, he cannot prove the Riſe of any one in his Way, 'twill ſurely be what they call a good negative Argument of the Truth of my Opinion in this Affair. For if the Mountains, now ſo frequent and obvious, every where, were caſt up, one after another, in different Ages, the Inhabitants of every Country had been always in Danger, or at leaſt under perpetual Fear; nor would all the Hiſtoryes of thoſe Times have been wholey ſilent in a Thing ſo ſurprizing, ſo well worth Notice and being recorded.

8. *The Origin of Iſlands. Particularly of that Heap of*

8. I have aſſerted that, as *Mountains*, ſo all *Iſlands had their Origin from the Deluge.* ‡ But the celebrated Dr. *Camerarius* fancyes that Nature has ſupplyed him with a late Inſtance,

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† *Nat. Hiſt. Earth*, Part 2.
‡ P. 347, 348.

Rubble raiſed in the Bay of San-torini, *called by ſome an Iſland.*

Inſtance abundantly capable of overthrowing my Doctrine. Says he, *That new Iſland, in the Bay of* Santorini, *is enough of itſelf moſt terribly to ſhake the whole Woodwardian Syſtem.* * That is, if this formidable Engine be managed by the moſt gallant and brave *Camerarius.* Let us therefore go on, to try his Strength. *It is,* ſays he, *an Iſland formed by a ſlow Emerſion out of the Waters, put together by many Earthquakes, Noiſes, and Flames, becoming at laſt ſo large, and ſo much raiſed above the Waters, and as it was joyned to Rocks that roſe together with it, and to thoſe of the Neighbourhood.* † A huge and formidable Engine indeed! but ſo far is it from ſhakeing, or giving any ſuch Blow to the *Woodwardian Syſtem*, that it cannot, by any Means, be ſo much as levelled at it. But to leave off talking, in Figures, in the Way of the moſt eloquent *Camerarius;* that Iſland, when I wrote my *Natural Hiſtory of the Earth*, was not in Being. So that

certainly

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* p. 347, 348.

† Ibid.

certainly it could not be expected that I ſhould predict its Riſe to follow in ſome ſhort Time. I then made mention of a Heap of Rubble like this, I mean the *Monte di Cinere*; only that was not caſt up in the Sea. For is not this Iſland juſt like that Mountain, the Matter, and the Cauſe of the Riſe of which I then fully explained? Are they not both of the ſame Kind, both thrown forth by the ſame Force of *Vulcanos?* For thus I had repreſented the Matter, and the Cauſe of that Hill, *That it is Nothing but a Heap of Stones, Cinders, and Aſhes, ſpued out of the Bowels of the Earth, by the Eruption of a Vulcano, in the Year* 1538; † nor indeed did I ever go about to deny, that there were already, or might be hereafter, others thrown up in the ſame Manner. Neither did I deny that Vulcanos may as well rage with ſuch Violence under the Sea, as in like Manner to break up its Bottom, and throw forth ſo great a Quantity of Matter as to pile ſuch a Heap of Rubble up to and above the Surface of it; for it is reaſonable to believe that, where-ever the Eruption of a Vulcano happens, whether at Sea or Land, its Force and Effects will be the ſame. If therefore the ingenious Dr. *Camerarius* is pleaſed to give the Name of *Mountains* to Heaps of Rubble, caſt out of the Earth by ſuch Means, he may, with all my Heart, call thoſe which are caſt up at Sea, *Iſlands*. But whatever he ſhall fancy, or take upon him to write, of theſe Things, I intreat him not to imagine that I was ſpeaking of ſuch Kinds of confuſed Heaps of meer Rubble, when I referred the Origin of all Mountains and Iſlands to the Time of the Deluge. For all thoſe which I call'd Mountains and Iſlands have the Matter, of which they conſiſt, laid in a Method, certain, regular, and like that of the reſt of the Globe: and are every where diſtinguiſhed into Strata, lying commonly in an orderly Manner each upon other. Whereas both the *Monte di Cinere*, and that Moles of *Santorini*, are Nothing but rude indigeſted Piles of Fragments of Stones, of Droſs, Cinders, and Rubbiſh. The Vulcano therefore that flung out that Bomb at *Santorini*, is ſo far from *ſhaking my* WHOLE SYSTEM, that it cannot ſo much as touch this one ſingle Propoſition, relating to the Origin of Iſlands; which, I hope, will be readyly admitted by every impartial Reader, eſpecialy a Perſon of ſo great Sagacity, ſo well verſed in the Study of Nature, and ſo candid a Judge of the Works and Performances of Writers of all Kinds as your Lordſhip † is univerſaly allowed to be. But if this Part of my *Syſtem* remains ſtill firm and unhurt by *ſo many Earthquakes, ſo many Bellowings, and Flames*, which Way will this expert Ingeneer ply his Machine to ſhake and overturn all the reſt of the Parts of it? Let him try, if he thinks fit, whether he can, by Arguments taken from this Phænomenon, refute what I have wrote of Vulcanos, of Earthquakes, of the

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† *Nat. Hiſt. Earth.* Part 2. ſub. fin.

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† The E. of *Pembroke*, to whom this Treatiſe is addreſſed.

Seaſon of the Year in which I have proved the Deluge happened, as alſo what I have wrote of Amber, and of the Situation of Paradiſe, with very many other Things. For what I have propoſed concerning every one of theſe, he cannot deny to be *Parts* of that my *Syſtem.* If that be what he here contends for, I can indeed willingly grant him, that the Arguments, he has drawn from this Phænomenon, as much affect any of my other Propoſitions, as they do this of the Origin of Iſlands; which they are ſo far from having weakened, that they rather have eſtabliſhed and confirmed it. In a Word that whole *Syſtem* appears, not only to myſelf, but to not a few others of the moſt accurate Searchers into Nature, ſo well and effectualy ſupported by Obſervations, that I cannot think any one that ſhall apply himſelf to theſe Searches, with like Accuracy and Diligence, will ever go about to diſpute any Part of it. For all others, they may go on, and pleaſe themſelves with their own Opinions.

The Concluſion of this ſecond Part. With what Diſpoſition of mind I ſet my ſelf to read Dr. Camerarius *his Diſſertations.*

When firſt Dr. *Camerarius* his *Diſſertationes Phyſico-Medicæ* came to my Hands, I thought my ſelf particularly concerned to take Notice of ſo much of them as related to my Writings; to the End that, if I found any Part of my Doctrine confirmed by the Judgment, and improved by the Wit, of ſo great a Man, I might have leſs Apprehenſion from the Cenſure of others: or that, if he had candidly and friendly corrected any Miſtakes, or pointed them out to me, I might have returned him Thanks for ſo obliging an Office, done me publickly, in a Manner as publick: or finaly, that, if he had, as is the Cuſtom, not only with vulgar Readers, but with the Generality of Animadverters, ſeemed, which yet I could not have ſuſpected in ſuch a Man, to have read my Writings, purely to pick an Occaſion of Cenſure, and, relying on the Reputation he had acquired, and his own ſprightly Genius, to condemn thoſe Things, which, only becauſe they were new, he would not aſſent to, and yet could not prove them erroneous, I might take the Occaſion to vindicate and aſcertain the

Truth of them. When, contrary to my Expectation, I found I had fallen into the Hands of ſuch an Animadverter, tho' I had many other Things which might advantagiouſly have been offered here, I determined to produce only ſuch Arguments as might defend what was called in Queſtion, and at the ſame Time diſcover the haſty Judgment of this Critick upon me. Some Things indeed there are brought by him into Diſpute which I have deſignedly paſſed over, but they are only ſuch as any Perſon, I thought, beſides himſelf, the leaſt converſant in theſe Studyes, would not raiſe any Difficulty about. Yet ſeveral of thoſe I have touched upon are ſuch as ſhew how negligently the Author hath run over my Book, how little converſant he has been in theſe Studyes, and how far he was from being ſufficiently apprized of the State of the Earth, and the Nature of Foſſils, the Subject he took upon him to treat of. Had I ſought after Inſtances of this Sort, I ſhould have found Plenty enough of them every where. But what I have done in that Way is only ſparingly, and that too by Conſtraint.

With what View, and in what Method, I have anſwered them.

ſtraint. I have only defended my ſelf, and the *Truth* of what I had laid down relating to the Earth, and all Foſſils, eſpecially Metalls; which I conceived would neither be unacceptable to Gentlemen who are curious, nor diſadvantagious to the Eſtates of thoſe who had Mines in them.

Hinderances to the Search of Truth.

Now that I am ſpeaking of Truth, I can not well forbear making ſome few Remarks on this Subject. While ſome allow themſelves ſo much Liberty, and others are ſo eaſy to be miſlead, and carryed away, by the Conceits of every One that ſets up for an Author, the Condition of Truth muſt needs be very precarious, and unſettled. And, as with the *Romans* of old, ſo is it at this Day with us,

*We have impoſed on us the Shew inſtead of the Subſtance of Truth**. It is frequently ſo wrapt up in Clouds, and the thickeſt Darkneſs, that but few there are who know the Way to approach, or diſtinguiſh it; that 'tis not to be wondered at that there's in Science ſo little that is eſtabliſhed and certain. If, as there are many, there be thoſe who make Obſervations of Things with the greateſt Diligence, and afterwards publiſh them with not leſs Care and Fidelity, there will ſtraitways ſtart forth others, who, buoyed up wholely with Opinion of their own Genius, tho' realy deſtitute of all true Knowledge of Things, will yet be ever making ſuch a Shew of their Skill, ſuch Confuſion in the Things they take upon them to treat of, in a Word, rendering them ſo dark, ſo perplexed and intricate, that but few Readers are capable of determining whom to follow, or what to depend on. By which Means it is that ſuch Undertakers are ſo far from contributing to the publick Good, as they would be thought, that they defeat, and do it the greateſt Injury imaginable. Some alſo there are who make it their Buſineſs to decry the Works of others, without attempting to furniſh forth any Thing that is rational, or ſolid, of their own. Theſe are the *Goths* and *Vandals* of the Common Wealth of Learning;

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* Decipimur Specie Recti.----
Hor. de Arte Poet.

they acting the very ſame Part in this, that thoſe barbarous Nations did in the polite *Roman* World.

The Scope and Deſign of all my Writings.

As to my ſelf, the Truth has been ever what I ſolely aimed at: and in the compoſing that whole Work, which this Gentleman thus ſets himſelf againſt, I ſteered my Courſe intirely by Obſervation of Fact, and of the Things I treat of; nor have I therein propoſed any Thing, that does not rightly ſquare therewith. Nay, ever ſince the firſt publiſhing that Book, I have taken Care to have the ſame Obſervations carryed on, with ſtill as much Diligence as ever, all the World over; from which I have received not only many, but thoſe the moſt ſubſtantial Confirmations of what I then offered: nor, in all this Time, has the whole Field of Nature preſented ſo much as one ſingle Thing that has given me the leaſt Cauſe to doubt of the Truth of any one of thoſe my Propoſitions. 'Twas the Remark of a great Man among the Antients, that *Time ſtrikes out all Notions that are not well grounded, but eſtabliſhes thoſe which are*

The Doctrines, by me formerly delivered, confirmed by all Obſervations made ſince.

are founded upon Nature[*]. No Man living can be more conſcious to himſelf of his Weakneſs than I truly am of mine; but that Work will remain a laſting Teſtimony and Monument how far that Defect has been ſupplyed by my Diligence, and Faithfullneſs. There have not been wanting thoſe, who have not ſpared any Pains, nor left any Stone unturned, to find out Miſtakes, if they could, or any Thing that might deſerve Cenſure, in my Writings; but all, hitherto, wholely in Vain. Every Attempt, to invalidate, has confirmed them the more. For ſtill the more candid, and thoſe who were better Judges, have openly profeſſed, they never found any Thing alledged that, when brought to the Teſt, could deſerve the Name of an Objection. Neverthelеſs, if any One hereafter, upon diligent Peruſal, and well weighing what I have wrote, ſhall ſeriouſly think he has diſcovered in it any Errors, he can do Nothing more

The vain Attempts, of my Adverſaryes, in Oppoſition to them.

My Readyneſs to liſten to the Admonitions of thoſe who are candid:

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[*] Opinionum Commenta delet Dies: Naturæ Judicia confirmat. *Cic. de Nat. Deor.* L. 2.

agreeable to me, than in a friendly and candid Manner to admoniſh me of them. For by this Means he will realy purſue the ſame End with me, who never propoſed any Thing other than to make all my Studyes and Endeavours ſubſervient to the Cauſe of Truth. But if any one, out of a Spirit of Contradiction, or Hopes of raiſing a Reputation, by publiſhing ſome Notions and Opinions contrary to mine, without any Regard to Truth, ſhall hereafter take upon him to attack my Writings, he will have no Reaſon to expect that I ſhould neglect my own Affairs, and my other Studyes, to give him an Anſwer; tho' I am now doing it to a Gentleman, in whom I ſhould rejoyce to have found a Candour, and Skill in the Subject he has undertaken to treat of, equal to the Politeneſs, Wit, and Happineſs of Invention that he every where ſhews himſelf ſo much Maſter of.

and to diſregard thoſe who cavil, and are contentious.

THE

THE
NATURAL HISTORY
OF THE
EARTH

Illuſtrated, and *Inlarged*: as alſo, *Defended*, particularly againſt the late OBJECTIONS of Dr. *Camerarius*.

PART III.

III. SO much of what was requiſite for my own juſt Vindication, being thus delivered in the two former Parts, I now paſs on to diſpatch what yet remains further to be ſpoken to. Now, if this learned Gentleman would be thought to have dealt fairly by me, and at the ſame Time to have given Proofs to others of his own Abilityes, after having refuted what he thought in me Errors, he

III. *The third Part of this Diſſertation, wherein are examined Dr.* Camerarius *his Conjectures, ſet up, by him, in Oppoſition to what I have advanced.*

ought to have ſet up his own Opinions, againſt mine; but thoſe only ſuch as are attended with Evidence very convincing, and much more probable than mine. This indeed is no more than what he well knew, and confeſſed, his Readers might juſtly expect from him. For thus he addreſſes * the *Noble Perſon*, to whom he writes. *Methinks I hear You object, that I have indeed rendered thoſe Things dubious, but have not pointed out any other Way whereby thoſe figured Foſſils could be produced, and brought into the Bowels of the Earth. But that is not my Buſineſs: nor am I duely qualifyed for it. Expect not therefore*, ſays he, *any Thing more of me than only ſome Conjectures, and thoſe perhaps ſuch as carry no Shew of Truth, and are ſupported by no ſolid Reaſoning.* But ſurely, if any Thing was, this was his *Buſineſs:* and what was apparently *expected* from him. Now realy, whatever ſhew of Modeſty this may carry in it, theſe Expreſſions compliment the great Parts of the Author to the higheſt Degree that well can be; ſince they ſhew he expects that bare *Conjectures* of his, nay tho' looked upon by himſelf as ſlight ones, ſhould paſs current as ſufficient Anſwers to the ſtrongeſt Arguments of others. To think that in theſe Words of his he gives his real Judgment of his own Performance, muſt ſurely be ſurprizing, and indeed hardly credible. For how can it well be thought that a Man ſo ingenious, and diſcreet, ſhould go about to offer what carryes *no ſhew of Truth*, in Lieu of, not what realy is ſo in it ſelf, but what he only ſurmiſes, he has *rendered dubious?* to offer, as his *Conjectures*, what he confeſſes *are ſupported by no ſolid Reaſoning?* Or how could he ever believe ſuch would paſs upon his Friend, who he repreſents to be as eminent for his Judgment as his Quality? But, after all, let us conſider theſe *Conjectures:* and they are ſuch as follow,

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* P. 344.

1. The Sea-ſhells, now digged up in all Parts, were not repoſited in the Earth at the Time of the firſt Separation of the Waters from the dry Land, nor before the Deluge.

1. *Some ſhells*, ſays Dr. *Camerarius, were perhaps lodged there, in the Earth, before the Deluge, at the firſt ſeparation of the Waters from the dry Land*, * *i. e.* at the Creation. Now certainly this *Conjecture* of the learned Author will never appear very probable to any One, who hath obſerved what Plenty, and how great Variety, of theſe Bodyes, are found in the Earth; eſpecialy if he has ſeen the whole Skeletons of Whales, the Teeth and Bones of Sharks, and of other Fiſhes, as alſo Sea-ſhells exceeding all Number and meaſure. Among others, of that Kind which *Fab. Columna* † calls *Concha Anomia*, I my ſelf have taken Notice of many Millions in that one County of *Gloceſter*; not to mention thoſe which I have obſerved in other Countryes, and thoſe I have received Samples of from almoſt all Parts of the World. That ſuch an Abundance of Shell-Fiſhes, of the ſame Kind, ſhould have been created, all at once, at the very

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* p. 346.

† De Purpura. C. 12.

Beginning of Things, can hardly ſeem credible to any thinking Man: and ſtill leſs credible is it that, without any Cauſe, they ſhould immediately be extripated, and deſtroyed. Dr. *Camerarius*, very ingenious, as he certainly is, has not been able to find out, at leaſt has aſſigned no Reaſon for the Deſtruction of them. Whereas, what Exceptions ſoever he may be pleaſed to make to it, that *Deſtruction of the firſt Creation*, * which I ſuppoſed, † I have proved was brought on with a Deſign worthy of the Divine Wiſdom. Beſides, there are almoſt every where found, ‡ in the Earth, Shells, of the very ſame Kind, ſome ſmall, others large: ſome young, others old: ſome immature, others full grown: and, in a Word, ſmall Ones affixed to the larger, or thoſe which are young to the Old Ones, juſt in the ſame Manner as they commonly are found at Sea, for their better Security againſt the

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* Dr. *Camer.* Diſſert. p. 344.
† *Nat. Hiſt. Earth.* Part 2.
‡ Ibid.

Shocks and Injuries of the Tides and Storms. Theſe certainly give plain Proof that they were not all created together; but generated ſucceſſively, and at different Times. To this may be added, that the very Order ‡ in which theſe Bodyes are often found diſpoſed: and thoſe Indications, which ſo many Shells and Plants carry with them, of the Seaſon of the Year in which the Deluge began, * ſufficiently prove this *Conjecture* of Dr. *Camerarius* to be without any Grounds. I ſhall ſay nothing here concerning the Bones of Quadrupeds, or about Vegetables, and in particular the great Trees which are commonly found lodged in the Strata, none of which could ever be the Production of the Waters. But, if I ſhould, after all, aſk by what Authority this learned Gentleman affirms that, when the Earth was firſt created, it was covered with Water, and that afterwards the Waters were *ſeparated from the dry Land?* He muſt immediately mediatly anſwer, that of *Moſes*, Gen. i. But then *Moſes* tells him likewiſe that thoſe Bodyes, which are now found lodged to the greateſt Depths in the Earth, were none of them created till after this *Separation of the Waters was made.* For the Waters withdrew on the third Day of the Creation *; but Fiſhes, and the other Inhabitants of the Waters, were not made till the fifth, † which was two Days after. When therefore a Perſon, who would ſeem to write with ſo much Caution as Dr. *Camerarius*, ſays, that theſe Bodyes were left at Land, upon the Retreat of the Waters, when they were not created, and had not ſo much as Being till two Days after that Retreat, he ſays a Thing which ſurpaſſes not only mine, but the Apprehenſion of every Man of common Senſe. Now, tho' he cannot ſhew us how this could poſſibly be, I will not ſtraitways pronounce *the whole Camerarian Syſtem*, ‡ of which I have ſeen but a ſmall

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‡ p. 45. to 49. ſupra.
* Part 1. §. 4. ſupra.

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* Gen. i. 9, 13. † Gen. i. 20, 23.

‡ Diſſert. 19. p. 348. Confer. Part 2. § 8. ſupra.

Part, quite overthrown, yet I cannot well forbear thinking at leaſt this Propoſition of it, to be moſt *terribly ſhaken.*

2. Theſe Shells were not originaly lodged in the Fiſſures, but interming-led, and incorporated with the Matter of the Strata, while this was ſoft, looſe, and in a State of Diſſoluti-on.

2. But let us proceed to the ſecond *Conjecture* of the famous *Camerarius*, and ſee if that be more ſubſtantial. *Many of theſe Marine Bodyes*, ſays he,* *were hurryed by the Deluge into the Earth, through its Chaſms and Fiſſures.* For my Part, I allow that, not only *many*, but *all of them* were brought to Land by the Deluge. Dr. *Camerarius* invented thoſe Fiſſures, the better to introduce the Shells into the Bowels, and interiour Parts of the Earth, and to elude the Doctrine of the Diſſolution of the Strata. But, if they were then thrown into Fiſſures, they would be found in Fiſſures now. Whereas, I never found ſo much as one of thoſe Bodyes any where in the Fiſſures, nor have I read or heard, of any Man that ever did. They are always found, either looſe on the Surface of the Earth, or in-

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* p. 346.

corporated with the very Subſtance of Stone, and even the moſt ſolid Strata. If therefore he appeals to Nature in this Affair, ſhe certainly gives her Suffrage for me. But, if he argues that thoſe Fiſſures, and Chaſms, have been ſince filled up in Tract of Time; neither has that any the leaſt Appearance of Truth in it: and Nature her ſelf Shews the direct contrary. For, was the Thing ſo, the Shells, and thoſe other Bodyes, would be now found in the perpendicular and other Fiſſures, and not in the Strata themſelves, nor in that adventitious Matter with which the Fiſſures are ſuppoſed to be filled. But the Fact is quite otherwiſe; they are found lodged promiſcuouſly, and without any ſuch Diſtinction, indifferently in all Parts of the Earth. To which may be added, that, if there were formerly any ſuch Fiſſures, and filled up ſince, ſome Traces of them at leaſt would ſtill appear. That, the Variety of the Matter, and of the Conſtitution and Hardneſs of it, in the ſame Stratum, would readyly and manifeſtly diſcover; which yet we no where find it does. Another very ſtrong

Argument likewiſe, to me, that theſe Marine Bodyes were not originaly thrown into, and lodged in Fiſſures of the Earth, is, that there are ſuch Multitudes of them, met with, even in the moſt midland Countryes, every where all about for many Miles together, particularly here in *England*, throughout almoſt the whole Countyes of *Gloceſter*, *Oxford*, *Northampton*, *Somerſet*, and *Wilts*; in the Fields, and on the Hills. Or, where they have been lodged ſo deep that they cannot be now turned up by the Plough, and caſt out upon the Surface of the Earth, there they are found by thoſe that have Occaſion to dig down deeper, in the Bowels of the Earth. If theſe, and all other Parts of the Globe, in which ſuch Bodyes are now found, were once Fiſſures, and Chaſms, filled with no ſolid Matter, thoſe Fiſſures muſt have been ſurely of a prodigious and even incredible Extent. Finaly, tho' theſe Shells, every where found, in the Strata, and never in the Fiſſures, ſufficiently ſhew how little Dr. *Camerarius* was acquainted with this Affair, on which he ventured thus to paſs his Judgment, I will preſume to add one Thing further which muſt render his Overſight ſtill more evident. In Mining, and Opening Quarryes, at the Fiſſures of the Strata of Stone, it is common to find ſhells ſo broke in two, and divided with the Stone, that one Part of the ſame ſhells ſhall remain on this ſide of the Fiſſure, and the other Part on the other ſide of that Fiſſure. Which, tho' there were no other Argument of the ſame Thing, plainly proves thoſe Shells to have been lodged in the ſolid Strata, while they were continuous, and before thoſe Fiſſures were made: and alſo that both thoſe Shells, and the Strata, were broke, and divided, at the ſame Time, and by the ſame Means.

3. The third *Conjecture* of Dr. *Camerarius*, is that *theſe Shells were brought out of the Sea by particular Inundations* * Now I ſhould think that, before he had publiſhed this *Conjecture*, he ſhould have looked for

3. *Thoſe Shells were not brought out to Land by particular Inundations.*

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* P. 346.

for ſome Support for it in Hiſtory: and if he had found any Accounts of ſuch Inundations, as they would have been new, ſo they would have been very acceptable to the Republick of Letters, if he had publiſhed them. Or he ſhould at leaſt have produced from thence ſome Inſtances of *Inundations*, which have reached quite to the midſt of the greateſt Continents: which have laid his own Country, *Germany*, for two or three hundred Miles under Water; for, even there, at ſo great a Diſtance from any Sea, are thoſe Marine Bodyes found: he ſhould have given us Examples of ſuch *Inundations* which have conveyed Shells, peculiar to the *American*, and other the remoteſt Seas, into the very Midland Parts of *England*, where we, at this Day, commonly dig them up: nay ſuch as have brought Animals, that are Natives of the Land, or Rivers, into Countryes where it is not probable there were ever any of the ſame Kind before, and certainly are not now the Natural Product of thoſe Countryes; ſuch as Crocodiles, the Skeletons of which are found under Ground in *Germany*;* Elephants in *England*, where their Bones and Teeth are digged up in various Places; and that Kind of *American* Deer, we call the *Mooſe-Deer*, in *Ireland*, the Skeletons, and Horns, of which, of incredibly large Size, are often digged up there: finaly, which have fetched up by the Roots, and thrown down Trees, ſuch as thoſe large Pines, and Firs, which are found, in ſo great Numbers, buryed in almoſt all Parts of *England*, where no ſuch, not only in the Memory of Man, but in the Records of any Hiſtory, have been known to grow; it is certain, *Cæſar* ‡ teſtifyes none were here in his Time. Dr. *Camerarius* ſhould likewiſe have bethought himſelf of a Way by which theſe Marine Bodyes, brought from Sea, might, by the Violence of thoſe *Inundations*, be ſo intermixed, and incorporated with the very Subſtance of the Strata of Marble, and all Sorts of Stone, in ſuch Manner that, when theſe come to be now broke up, the Shells ſhould for be found lodged in all Parts of thoſe Strata: he ſhould have thought of a Way by which ſome of theſe Shells could have been caſt down to the Depth of ſeveral Hundreds of Feet in the Earth, while others were carryed up to the Tops of the higheſt Mountains, *e.gr.* of the *Alps* in *Europe*, and of other the loftyeſt *Aſiatic*, *Chineſe*, and *American* Mountains. When the learned Author framed this his *Conjecture*, he ſeems to have had *England* particularly in View, *An Iſland encompaſſed on all Sides with the Sea**. But he certainly ought to have conſidered that this our Iſland has Mountains, tho' not equal to thoſe juſt mentioned, very large, and high; of which I ſcarce know any, which have not Shells lodged in them to the very Tops. If therefore he can imagine thoſe Shells were carryed to the Tops of thoſe Mountains by any particular *Inundation*, what Condition does he think, *France*, and all *Europe*, nay and the whole Globe, were in, at that Time when the higheſt Hills in *Britain* were covered by the

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* Miſcell. Berolin. 1710. pag. 103.
‡ Com. de Bello. Gall. L. 5.

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*Page 290, 347.

Waters of that *Inundation?* For Water cannot be piled up in Heaps, but muſt flow about, till the Surface of it is on all Sides equidiſtant from the Centre of the Earth: and conſequently all Parts of the Globe muſt be then laid as deep under Water as *England.* All theſe Things being ſeriouſly weighed, by any Man, I can ſcarcely believe he will eaſyly come into this *Conjecture* of the ingenious *Camerarius:* or ever imagine that theſe Marine Bodyes could be brought from Sea, and lodged in all Parts of the Earth, by any other Means than the *Noetic* or Univerſal Deluge.

4. His fourth *Conjecture* is what follows. *Hence,* ſays he, *it is that ſo many Marine Bodyes are found in* England. *That Iſland, being environed by the Sea, admitts, by ſubterraneous Paſſages, the Waters of it into its Bowels deeper and further than you would imagine*[*]. But before he had ſuggeſted that thoſe Marine Bodyes were brought, through any Paſſages, *Subterranean* into the *Bowels* of the Earth, or

4. *Thoſe Shells were not brought, from Sea, into the Bowels of the Earth, by any ſubterraneous Paſſages.*

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[*] Pag. 347.

or its interior Parts, and ſuch as are very remote from the Sea, he ſhould have put it beyond all Doubt that there are ſuch *ſubterraneous Paſſages* from the Sea. Certain it is no ſuch are yet diſcovered. Whereas if there realy were ſuch, they would be eaſyly found out, ſo ſpacious † as they muſt be, to receive ſuch vaſt Bodyes into them, and to give Way for them to paſs into the very Middle of this Iſland. Not to mention others, many Shells of the *Ammonite* Kind, two Foot over, are digged up in *Portland*, and ſome broader in *Gloceſterſhire* and *Somerſetſhire*. Beſides the Skeletons and Bones of Whales, and other the largeſt Fiſhes, are digged up here. But for what Purpoſe can we think thoſe Fiſhes ſhould ſwim up theſe Paſſages, if there were any ſuch? And to Places ſo far diſtant from the Sea? For Nature has not aſſigned them any agreeable Way of Living or Habitation under the Earth. But ſhould we ſuppoſe ſo great Numbers, ſome of them of ſo vaſt a

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† Conf. p. 140. *ſupra.*

Bulk, to have been hurryed and thrown up hither, that could never have been effected without a Force far greater than is eaſy for us to conceive or imagine. And why do not we ſee as great Numbers of them in our Times forced up by the ſame Violence? Some †, who defend this Opinion, think the Waters are carryed through thoſe Paſſages from the Sea, to ſupply the Springs and Rivers; but without any Proof from Nature, or Shew of Reaſon. For was it ſo, the Spring and River Waters would be ſalt, like thoſe of the Sea. Tis plain, were thoſe Paſſages ſo ſpacious, as to receive ſuch great Bodyes, as ſome of thoſe which we often find in the Earth, they could not ſeparate the Salt from the Waters by Percolation, nor by any other Means hinder its attending of them. In ſhort, the Water could not riſe, through ſuch Paſſages, above the Altitude of the Surface of the Sea. Whereas thoſe Shells, and other Bodyes, are found quite up to the very

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† *See* T. Laurence Mercur. Central. 12mo. Lond. 1664.

Tops of the higheſt Mountains, ſome Miles higher than the Sea, if not in *England*, at leaſt in other Countryes. But, laſtly, there's an Argument equivalent to almoſt all the reſt, which is that theſe Marine Bodyes are never found, either in Fiſſures, or ſubterraneous Paſſages; but lodged in the very Strata of Marle, Clay, and of Stone, and every other even the moſt cloſe denſe and ſolid Matter. Are therefore thoſe Paſſages, through which the Springs and Rivers are ſupplyed with Water, uſualy damm'd, and fill'd up with terreſtrial Matter, and Marine Bodyes? If ſo, whence have we at this Day remaining any Springs or Rivers? Or do thoſe Paſſages, and ſubterraneous Channels, frequently change their Courſe, from one Part of the Earth to another? We certainly no where ſee or obſerve any Thing of this Kind. Springs, and the Heads of Rivers are at this Day in the very ſame Places that they antiently were. Nor indeed does there any where appear, in Nature, any Power that is ordinaryly capable of effecting ſuch Changes in the Earth. If there were ever any ſuch Changes made, thoſe

Marine Bodyes would be now found, lying in a certain Method, and Track, anſwering the former Courſe of thoſe Channels filled up ſince; which, as I have ſufficiently ſhewed before, is no where to be ſeen.

5. *Thoſe Shells were not created, by God, in the Bowels of the Earth; but bred at Sea.*

5. Thus far I have had under Conſideration what Confirmation from Nature, and the Things themſelves, and what appearance of Truth, the four firſt *Conjectures* of Dr. *Camerarius* carry along with them. But what ſhall I ſay to his fifth Conjecture? He thinks *it no abſurdity to ſuppoſe God to have made ſome Analogy and Reſemblance betwixt Marine and terreſtrial Bodyes, by creating various Kinds of Stones repreſenting the Forms of Sea-Shells* *. By the ſame Rule alſo Hazle Nuts, ſuch as grow on Trees upon the Earth, Pine Apples, nay even Oaks, and other Trees, and Vegetable Bodyes, which are found buryed to a very great Depth in the Earth, were all there *created by God.* This is indeed an eaſy Way of ſolving all thoſe Difficultyes,

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* Pag. 348.

cultyes, but founded on no Support of Nature, or Atteſtation of Holy Writ. After all, ſuppoſing God did create theſe Bodyes entire, did he likewiſe create Pieces and Fragments of them in the Earth? For 'tis common to dig up Fragments of Shells: and, in ſome Places, only the upper Shells of Bivalves, in others, only the lower Shells: nay Bivalves, turbinated, and indeed Shells of all other Kinds, without having in them the Animal or Fiſh belonging to theſe Kinds. But perhaps we may ſet this Conjecture of Dr. *Camerarius* in a better Light, if we imagine *Ariſtæ* or Beards of Corn created without the Ear, the Bark of Cedars without the Wood, the Hides of Oxen without the Fleſh and Bones, the Skins of Men without their Bodyes, and Hands or Legs without the reſt of the Limbs, or other Parts. For in the ſame Manner the Foſſil-Shells and other Things we treat of, are often found in the Earth; *e. gr.* all Sorts of Shells without the Fiſh in them, ſome one Bone without the reſt of the Skeleton, or a ſingle Tooth without the Jaw. But to paſs over theſe Things, and what I have produced to the ſame Purpoſe in the *prelim. Diſſert. to my Nat. Hiſt. of the Earth*, there are many other Things which much weaken this *Conjecture*: and which the *Camerarian Hypotheſis*, that allows only the Figure and Similitude of Marine Bodyes to thoſe Foſſils, cannot account for. 1ſt. The Shells, which are digged up in Places, and found lodged in Matter, fit to preſerve them, and which therefore are firm, ſound, and have leſs felt the Injuryes of Time, yeild ſtill a true Marine Salt, ſuch as recent Shells taken out of the Sea, or caſt on the Shores, are wont to yeild. This is certainly worthy the Conſideration of the learned Author: and tis what I had long ago put him, and my other Readers, in Mind of, *Nat. Hiſt. Earth*, *prelim. Diſſert.* 2. There are alſo found in the Earth the Teeth of Fiſhes ground down, and worn away, in the very ſame Manner as the Teeth of thoſe Kinds of Fiſhes, taken at Sea, uſualy are, by chewing their Food. 3. The Shell-Fiſh called the *Purpura*, has a Tongue of a conſiderable Length, terminating in a hard boney ſharp

Point, with which, as with an Augre, he bores Holes thro' the Shells of other Shell-Fiſh, and feeds on the Subſtance of them drawn forth thro' thoſe Holes. This has been obſerved of the *Purpura* by the antient Naturaliſts, particularly *Ariſtotle*, and *Pliny*. Thus *Ariſtotle* writes concerning it, *ſuch is the Strength of this Member*, the Tongue, *in the* Purpura, *that he is able therewith to pierce thorow the Shells of Shell-Fiſh, particularly thoſe of the turbinated Kind, with the Meat whereof he is wonderfully delighted* *. What *Pliny* † ſays, is, *the Tongue of the* Purpura *is about a Finger's Length, with which he feeds himſelf, by boring thorow the Shells of other Shell-Fiſh; ſo hard is the Point of it.* Now there are commonly found in the Earth, among others,

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* Ταῖς γὰρ πορφύραις τοσαύτην ἔχει δύναμιν τοῦτο τὸ μόριον, ὥστε καὶ τῶν Κογχυλίων διατρυπῶσι τὸ ὄστρακον, οἷον τῶν στρόμβων. οἷς δελεάζουσιν αὐτάς. Ariſtot. de Partib. Animal. Lib. 2. C. 17. verſus finem.

† Lingua Purpuræ Longitudine digitali, qua paſcitur perforando reliqua Conchylia; tanta Duritia Aculeo eſt. *Hiſt. Nat. Lib.* 9. *C.* 36.

thers, Shells bored thorow in the Manner above deſcribed; whence it is certain that thoſe Shells had once living Fiſhes in them, and that thoſe Fiſhes formerly lived in ſome Place, where alſo there were *Purpuræ* to feed on them: and that Place could be no other than the Sea. 4. It is common to dig up the Shells of Oyſters, *Conchæ*, *Pectines*, and other Bivalves, which retain plain Marks of Tendons, and other Signs which undoubtedly ſhew that they had once actualy the living Creatures in them. 5. Laſtly, the *Echinitæ*, *Conchitæ*, *Cochlitæ*, and other Bodyes of that Kind, conſiſting of Stone, Flint, Spar, and other Mineral Matter, which every Way match the Size, and exhibit the perfect Reſemblance of the interior Part of thoſe Shells, from which they have derived their Names, could never have been ſo formed, moulded and ſhaped, had not thoſe Shells been quite empty. But there are other Bodyes alſo, of which I have Samples by me, formed likewiſe of Stone, Flint, and Spar, which repreſent only Pieces, or ſome particular Parts of the *Echinitæ*, *Conchitæ*, *tæ*, and *Cochlitæ*. Theſe, any One, at firſt Sight, may plainly diſcern were formed in the Shells, while they had yet their Fiſhes actualy in them: and therefore could receive only ſo much of the Stoney Flinty or Sparry Matter, as would fill up the Parts which were empty or vacant, and not poſſeſſed or taken up by the Fiſh. Thence it is, that thoſe Stoney Flinty and Sparry Bodyes bear only the Reſemblance of that Vacancy, as having been moulded in it. Now theſe Bodyes plainly ſhew thoſe Shells to have had Fiſhes formerly in them: and at the ſame Time point forth to us the true Origin of them; *viz.* that they were not produced in the Places where they are now found, but were at ſome Time brought all from the Sea.

The groſs Miſtake of thoſe who imagine, not only Shells, but ſeveral artificial Things dig'd up, were formed in the

But let us conſider this *Conjecture* of Dr. *Camerarius* a little more attentively, to ſee if it may not be applyed to other Uſes, and made to explain ſome Things, which have afforded hitherto Matter of Diſpute to the Learned. Indeed I cannot think that Dr. *Camerarius* will take it ill, if I endeavour to improve, inlarge,

large, and render more uſefull, what he had the Ingenuity, and good Fortune firſt to find out. It is common in many Places to dig up Coins having inſcribed on them the Names of *Alexander the Great*, *Julius Cæſar*, *Cunobeline*, and other Emperors and Kings. Should any fancy that theſe were ſtamped by ſome Mint-Maſter many Hundred Years ago, and afterwards loſt, or hid and buryed in the Earth, and have lain there for ſo long a Time, he truly would ſeem to reaſon much after the common Rate, and juſt as thoſe do who believe the Shells, found in the Earth, were originaly produced at Sea. 'Tis much the ſhorter and eaſyer Way of deciding ſo diſputable a Point, if, as the Matter of the Coins muſt, ſo likewiſe the Forms of them, be aſcribed to the Workmanſhip of God. And he who thus happyly firſt removed this cruel Stumbling-Block, out of the Way of the Students of Antiquity, can never be thought leſs deſerving our Praiſes and Rewards than he who ſhall happyly find out

Earth, by Nature playing and ſporting under Ground.

Where there grow Flow'rs inſcrib'd
with Names of Kings [*].

Nay further, if it ſo fall out that thoſe employed in digging, ſhould, as they frequently do, find, under Ground, Things carrying with them the Appearance and Shape of Pots, and Earthen Veſſels, tho' thoſe Things have been hitherto taken for antient *Roman* Urns, *Pateræ*, or *Simpula*, yet it would be intolerable, that we, and all Poſterity ſhould run ſtill on in the ſame Miſtake. For in good Truth it is to the full as likely that theſe Pots, and other Things, were formed by Nature in the Earth, as thoſe Shells. But leaſt I ſhould ſeem to propoſe this raſhly, or to arrogate to my ſelf the Honour of this *Conjecture*, ſo much of a Piece with that of Dr. *Camerarius*, there are ſome Writers of Natural Hiſtory, and indeed principaly thoſe, that will needs have it that the Shells, found in the Earth, were produced there, who advance the ſame Opinion concerning theſe Utenſils.

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[*] Quibus in Terris inſcripti Nomina Regum
Naſcantur Flores.-- ---

Whether or no, if Dr. *Camerarius* gives Sanction to this Opinion of thoſe Writers, People may not go hereafter to ſearch for Earthen Ware, as now they do for Ores of Metalls, in the Bowels of the Earth, and ſo finding them there under Ground ready made to their Hands, have no need to buy, or have Recourſe to the Potters, they may not be all undone by the Shift, I cannot tell; let them look to that. But, certain it is, that *Boh. Balbinus*, with great Elegancy, calls theſe Veſſels *Foſſil Pots* *. *Conrad Geſner* terms them *Native Pots* †. And Dr. *Jo. Dan. Major* treats of them as of *Foſſil Urns* ‡. *Balbinus* gravely and wiſely *argues that Clay---- readyly, and of its own Accord, diſpoſes it ſelf into the Shape of Pots, Nature her ſelf directing what ſhe would have here done* ⸸. Finaly another like ſagacious Writer, treating of Pots digged up near *Spremberg* in the lower *Luſatia*, is of Opinion, *That the Poſſibility of ſuch Pots being formed by Nature is not to be diſputed**. This Way indeed of arguing and making Inferences, having already got Authors of ſo ſtanch Judgment, and Patrons ſo mighty, if it ſhould at laſt prevail as to the Formation of Shells, Bones, Teeth, and other like Bodyes in the Earth, it would make the whole Matter ſo eaſyly intelligible, that no Doubt or Diſpute can ever poſſibly be raiſed about it hereafter. But yet I cannot forbear telling them that there is one Thing I would adviſe the Authors that ſhall take upon them this Task, to write, not in Proſe, but in Verſe, nor were it amiſs that it ſhould be ſet alſo to ſome ſuitably merry Tune; ſince *that Nature*, to which, they aſcribe ſuch Works, can be only fictitious, and *Poetical*: and that *God*, which *Camerarius* brings in here meerly imaginary, and *Mechanical*[*]. But 'twere to have been wiſhed that this ſo conſiderate a Writer had taken here the Advice of one of the beſt Judges of Poetry that ever lived,

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* Ollas Foſſiles. Miſcell. Hiſt. Regni Bohem. L. 1. C. 49.

† Ollæ Nativæ. De Fig. Lapid. p. 87.

‡ Urnis Foſſilibus. Diſſert. Epiſt. de Cancris & Serp. petrif. p. 43.

⸸ Exiſtimat Argillam--- ad figuram Ollarum ſponte ſeſe ac libenter componere, Natura ipſa quod fieri velit docente. Loco ſupracitato.

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* Credit naturæ in ejuſmodi fabricandis Ollulis Poſſibilitatem non eſſe detrahendam. D. Ebr. Hagendon Miſcell. Cur. Ann. 3. Obſ. 137.

----Ne'er introduce a God,
But for a Cauſe right worthy of a God [†].

With ſo much Reverence did he, in thoſe Days, think thoſe his Gods, tho' realy no better than fictitious, ought to be treated. But they who ſuppoſe the One only true God, the great Author of Nature, to be thus employed, in making Toyes, and Things of no Uſe, may be deſervedly thought either not rightly to know God, or not to pay him due Reverence. So that a Man of great Wit and Learning, Dr. *Hier. Cardan*, with good Reaſon, ſharply reprimands that raſh Way of Conjecturing; *We ſorry idle Fellows*, ſays he, *talk of God as of one*

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[*] Θεὸς ἀπὸ μηχανῆς.

[†] Nec Deus interſit niſi dignus Vindice Nodus
Inciderit.------ De Arte Poet.

one of us ‡. Of the ſame Sort alſo is that other *Conjecture* of the famous *Camerarius*, where he ſays, *he had rather ſuppoſe the beneficent Creator would have ſhewed Men the Uſe of Letters, than believe he would have let them lived for ſixteen and more Ages without the Knowledge of them, or that Picture ſhould be more antient than ſimple Writing* *. 'Tis impoſſible ſurely but that, from the Time this lucky Conjecture was firſt advanced, *Polidore Vergil*, *Geo. Paſchius*, and others who have wrote of the Inventors of Things and Arts, muſt loſe the Eſteem they have hitherto obtained, and be now finaly wholely deſpiſed. Nor can it be well wondered at if the late Author of *Muſcipula*, who, in his facetious Manner, attributes the Invention of the Mouſe-Trap to his happy *Welch* Hero, he reckoned fit Company for ſuch *Poetical* Writers.

But

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‡ Nos Nebulones loquimur de Deo tanquam de uno e nobis.

* Pag. 304.

Of the ſuppoſed Analogy betwixt ſome Marine, and Terreſtrial Bodyes.

But Dr. *Camerarius*, not to ſeem altogether deſtitute of an Argument, takes in one, and that only, from Analogy. *As*, ſays he, God *will have Species of Vegetables in the Sea, perfectly analogous and* like *others at Land, in that great Variety of Coralls, Corallines, Spunges, Alga's, Fucus's*, &c. *what hinders but that there may be ſuch a Vegetation* and Growth *of Stones in the Earth, as there is commonly at Sea, and as is eſpecially obſervable in Coralls, that are of Stoney Nature* *. Moſt certainly nothing *hindered* but that God might have done ſo; tho' that he actualy has done ſo, does not thence by any Means follow ſo far as I can perceive. But if it were ſo that God had made Bodyes *at Sea analogous to others at Land*, it does not thence follow, that he muſt likewiſe, on the other Hand, have needs created Bodyes at Land reſembling thoſe at Sea, or that there ſhould be *any Vegetation of Stones, in the Earth*, repreſenting Marine Bodyes. But not

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* Pag. 349.

to inſiſt upon this, let the learned *Camerarius*, if he can, produce ſuch Bodyes growing *in the Sea*, either *Coralls*, *Corallines*, *Spunges*, or any other, which are *analogous to Terreſtrial Bodyes*, either in their outward Form, or inward Texture. For, in Truth, neither I, nor any Body elſe, ever ſaw any Samples of ſuch Things. But when he, from his better furniſhed Cabinet, and Store, ſhall be able to produce any, I will readyly come into, and embrace this his *Conjecture* concerning them.

The Concluſion to the right honourable the E rl of Pembroke.

Theſe, my Lord, are the Objections which the learned Dr. *Camerarius* has been pleaſed to offer againſt what I have ſet forth, in the *Nat. Hiſt. of the Earth.* Of what Force and Weight they are, whether he had realy any juſt Cauſe for writing at all, and whether what I have here replyed may be admitted as a full Anſwer to him, I willingly leave to be determined by any impartial and intelligent Perſon, but, above all, your Lordſhip, to whoſe diſtinguiſhed and uncommon Judgment, as in all others, ſo likewiſe in theſe Studyes and Subjects, I pay a very great Deference; wiſhing, moſt ſincerely, that, as you have hitherto done, you may long continue to live, with Health, and Proſperity, a Benefit, and Bleſſing to this our Age, our Nation, and this great Metropolis.

Greſham College
xi *Dec.* 1713.

FINIS.

G.R III

ERRATA,

Occaſion'd by the Editor's being at a Diſtance from the Preſs.

PAge 1. line *ult.* after *Art* add (,) P. 5. l. 14. read—*but whoſe Authority.* P. 12. inſtead of *Prelun,* in the Reference at the Bottom, r. *Prælim.* P. 17. l. 8. r. *From theſe ſtrange Shells.* P. 31. l. 17. inſtead of *interior Figure,* r. *inward Form.* ibid. l. 26. inſtead of *the* Book, r. *his* Book. P. 61. the laſt Marginal Title ſhould ſtand higher againſt l. 19. P. 73. in the Reference, l. penult. r. ῾Οι ϗ̀ νῦν. P. 74. in the Reference, the Accents are wanting over ἀπόλλυται — πότε — γῆς. P. 145. l. penult. r. *ſubterranean Paſſages.* P. 156. in the Reference after *Flores* add *Virg. Eclog.* 3.

725. d. 38.